

## Appendix 14: Cultural Impact Assessment



# CULTURAL IMPACT ASSESSMENT

PREPARED FOR THE DUNEDIN CITY COUNCIL  
PROPOSED LANDFILL - SMOOTH HILL

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AUGUST 2020

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## Intellectual Property Rights

This report has been prepared for the Dunedin City Council (DCC) on behalf of Te Rūnanga o Ōtakou. Intellectual property rights are reserved by Te Rūnanga o Ōtakou and the Dunedin City Council.

In this document, the use of the terms 'Kāi Tahu' and 'iwi' refer to the three iwi who through historical intermarriage, warfare and alliance now make up Kāi Tahu: Kāi Tahu Kāti Mamoe and Waitaha. 'Ng' is changed to 'k' throughout this CIA, consistent with Kāi Tahu dialect.

Smooth Hill Cultural Impact Assessment	
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	<b>Report 1 of 1</b>  Dunedin City Council
<b>Status: Final</b>	<b>25 August 2020</b>

## Executive Summary

This Cultural Impact Assessment (CIA) assesses the potential cultural impacts of resource consents being applied for by the Dunedin City Council (DCC) to construct and operate a Class 1 landfill at Smooth Hill. This report has been prepared by Aukaha and informed by collaboration with Te Rūnanga o Ōtakou, the mana whenua of this part of Dunedin.

The report describes the proposal and the methods undertaken to complete this report. It assesses the potential impacts of the application on cultural values based on an analysis of relevant iwi management plan objectives and policies; and makes recommendations for dealing with potential impacts.

The key messages from the CIA are:

1. Smooth Hill is part of a wider cultural landscape which is imbued with the lived experiences of mana whenua tūpuna. These experiences and the values passed down through the generations inform mana whenua and Kāi Tahu Whānui identity, cultural practices and approaches to environmental management.
2. Mana whenua are committed to partnering with DCC to achieve efficient waste solutions that protect the environment, cultural values and the community.
3. Mana whenua seek opportunities to exercise rakatirataka and kaitiakitaka in ongoing discussions with DCC regarding waste minimisation and waste management strategy and implementation in Dunedin.
4. As a city, it is imperative to consider waste management solutions that are more sustainable and reflective of the DCC's zero waste vision and consistent with regional and national strategic direction. Mana whenua support the Waste Futures programme with its circular economy approach.
5. Mana whenua recognise the need for DCC to deal with waste in a pragmatic manner now, and as Dunedin's population grows. However, mana whenua question whether waste minimisation measures can be brought forward to reduce the need for waste to go to landfill beyond Stages 1 and 2 of the proposal.
6. Despite the mitigation measures set out to deal with surface and groundwater quality, concerns remain about the potential for leachate seepage within and beyond the site designation over the very long term. This concern extends to any impacts on the Ōtokia Creek.
7. It is imperative that stormwater management systems are robust, actively monitored and addressed in the event of inefficiencies or failures.

8. Mana whenua seek to protect and restore mahinga kai values and wetlands. This includes the regionally significant wetlands of the Lower Ōtokia Creek Marsh at Brighton.
9. The inherent values of the permanent and ephemeral waterways must be safeguarded and enhanced.
10. The effects of climate change, including extreme rain events, on the receiving environment should be accommodated in the design.
11. Mana whenua are supportive of undertaking riparian planting and replanting vegetation in the area with selected native species that reference the ecological whakapapa of the area.
12. In the spirit of manaakitaka, the community should be given sufficient opportunities to convey their thoughts, issues, concerns and aspirations in regards to this project.



## 1.0 Introduction

The Dunedin City Council's (DCC/ the Council) resource consents to run the Green Island Landfill are due to expire in 2023. With the impending closure of the Green Island Landfill, the Council is preparing to apply for consents to operate a new Class 1 landfill<sup>1</sup> at Smooth Hill for municipal solid waste. As part of the consenting process, the DCC has engaged Aukaha, on behalf of mana whenua to prepare this Cultural Impact Assessment (CIA). This forms the basis for ongoing engagement between DCC and mana whenua regarding this project.

This CIA provides an assessment of the proposal that is based on the relevant objectives and policies in the Kāi Tahu ki Otago Natural Resources Management Plan 2005 and a broader set of cultural values identified by mana whenua as relevant to the proposal. It is the product of mana whenua input on the wider cultural landscape and Kāi Tahu values, including cultural values with regard to waste management, and a review of the technical reports provided by the applicant. Specifically, the process included:

- A literature review of secondary sources regarding Kāi Tahu values related to the area.
- Discussions with mana whenua regarding the values held for the proposed area and the impact of the proposed landfill on those values.
- A review of the Ka Huru Manu Atlas which was developed through a cultural mapping project across the wider Ngāi Tahu iwi.
- A review of technical reports prepared for the Smooth Hill Landfill.
- A literature review on Kāi Tahu's approach to waste management.
- Review of relevant planning documents, including the Kāi Tahu Ki Otago Natural Resource Management Plan.
- Assessment of the proposal against a Kāi Tahu Values framework and the relevant objectives and policies of the KTKO Natural Resource Management Plan.
- A site visit

This CIA has four key functions:

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<sup>1</sup> Class 1 landfill: A landfill that accepts municipal solid waste. Class 1 landfills also generally accept Construction and Demolition waste, some industrial wastes and contaminated soils. (WasteMINZ, 2018)



- 1) It provides an account of the cultural values associated with the proposed landfill site and surrounding cultural landscape.
- 2) It provides information to Rūnaka about the proposal, its likely effects and the proposed mitigation measures.
- 3) It addresses the potential effects of the construction and operation of the landfill on those values.
- 4) It provides recommendations for mitigating effects on cultural values.

## 1.1 Waste Futures

Waste Futures is the overarching programme of work within which the proposed Smooth Hill Landfill sits. The programme of work is part of the Council's efforts to fulfil their duties under the Waste Minimisation Act 2008. The programme endeavours to identify and implement the best waste management solutions for Dunedin. It forms part of the Council's efforts to move Dunedin from a traditional linear economy where resources are used and disposed of, to a circular economy where resources are reused, repaired, remanufactured, or recycled.



A circular economy is fuelled by renewable energy such as solar, hydro, wind and tidal power, and biofuels. Through the Waste Futures programme, the Council aims to reduce Dunedin's net carbon emissions to zero by 2030 and achieve a zero waste (circular economy) by 2050. The ultimate outcome of a zero-waste economy is the elimination of waste being sent to a landfill as well as harmful discharges to land, water, and air. In

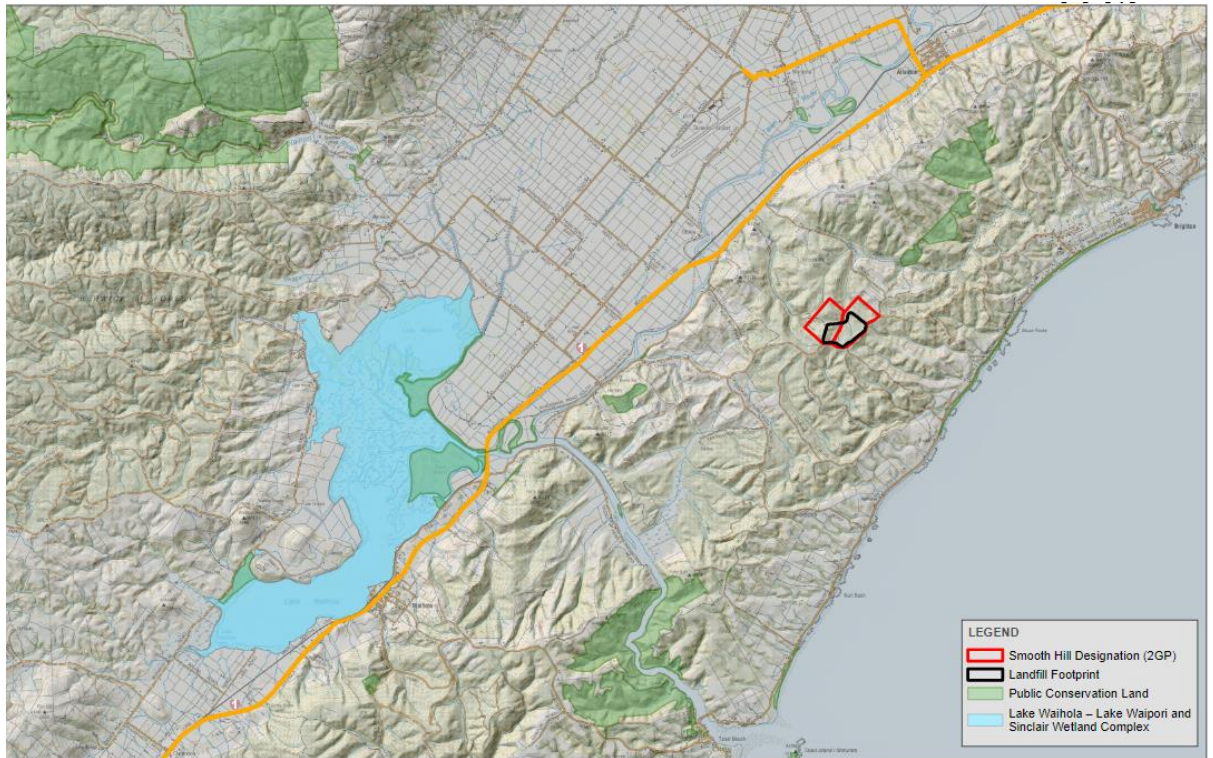
order to achieve zero net carbon emissions by 2030 and a circular economy by 2050, Waste Futures has three targets:

1. Reduce the municipal solid waste generation per capita by at least 15% by 2030 compared to 2015.
2. Reduce the amount of municipal solid waste disposed to landfill and incineration by at least 50% by 2030 compared to 2015.
3. Increase the diversion rate away from landfill and incineration to at least 70% by 2030.

The proposed Smooth Hill Landfill is consistent with the Waste Futures strategy whereby solutions such as a land fill are adopted in the interim until a zero waste (circular economy) is accomplished.

## **1.2 Site Location**

The proposed site for the landfill is shown in Figure 1. It is located on Smooth Hill, southwest of Dunedin and lies between SH1 and the coast. The site is bordered by McLaren Gully and Big Stone Roads. It was first identified as a potential landfill site in 1992 and is designated for landfill purposes in the Dunedin District Plan. The site is located in the headwaters of Ōtokia Creek in an area of coastal hills. The Ōtokia Creek is 13km long and includes a number of tributaries. It drains the hilly area to the southwest of Brighton before becoming an extensive tidal lagoon and flowing into the sea at Brighton. In its lower reaches, the Ōtokia Creek enters a medium sized estuary/lagoon before flowing to the sea across Brighton Beach. The estuary is a wildlife area and is used extensively for recreation.



**Figure 1: Smooth Hill Landfill Site Location**

The landfill site is located in a natural “amphitheatre”, which is bisected by a larger central ridge and a smaller ridge in the south-western corner which both trend south to north. The designated area outlined in red in Figure 1 above covers 87Ha of land. The proposed landfill would then cover 44.5 Ha of the designated 87Ha area. A south to north system of gullies passes through the site, which are dry most of the year with flowing water only after rainfall. The gullies coalesce into a single gully at the northern edge of the site and join in a permanent stream to the north of the site that passes under the McLaren Gully Rd via a culvert. The stream then joins the Ōtokia Creek that ultimately flows to the coast near Brighton, approximately 10km north-east of the landfill site. Big Stone Road runs along a ridge on the south-eastern edge of the site and is the catchment divide.

The DCC is not considering any alternative sites for the new landfill. Mana whenua understand that despite considering alternative methods for waste disposal, the DCC has concluded that the development of a new landfill is the preferred solution. The alternatives to developing a new landfill that were considered in 1992 included potentially extending the life of the Green Island Landfill, trucking waste to existing landfills in the wider region and incineration or biological treatment of the waste. Mana whenua were involved in the process of site selection at the time, and more recently, through broader engagement in the Waste Futures strategy.

## 2.0 Papatipu Rūnaka – Mana Whenua of Dunedin

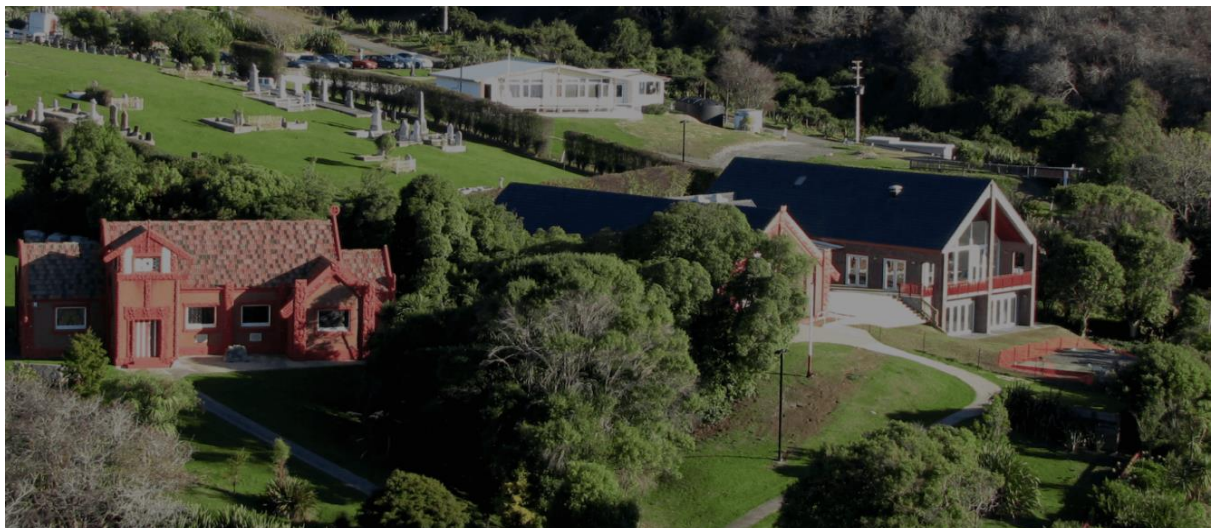
This section of the report describes the takiwā (area) of Ōtākou, and important sites in the wider landscape.

*We are of the Uruao, Arai-te-uru, Tākitimu waka, of the Kāti Rapuwai, Waitaha, Kāti Māmoe and Kāi Tahu people. Our traditions reach back to the very beginning of time, to the creation of land and sea, to the emergence of humankind. In this sense, we are a people who define their right to Manawhenua status and represent the mana of the land.<sup>2</sup>*

Mana whenua refer to those who hold the mana or authority over a particular area. In Otago, mana is held by seven papatipu Rūnaka depending on the location. Aukaha is a consultancy that is wholly owned by five of these Papatipu Rūnaka:

- Te Rūnanga o Moeraki
- Kāti Huirapa Rūnaka ki Puketeraki
- Te Rūnanga o Ōtākou
- Hokonui Rūnanga
- Te Rūnanga o Waihao

Te Rūnanga o Ōtākou have mana in the project area. The takiwā (area) of Te Rūnanga o Ōtākou centres on Ōtākou and extends from Purehurehu to Te Matau and inland, sharing an interest in the lakes and mountains to the western coast with rūnaka to the north and south.



**Figure 2: Ōtākou Marae. Source: Te Rūnanga o Ōtākou**

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<sup>2</sup> Kāi Tahu ki Otago Natural Resource Management Plan (NRMP) 2005. p.29





**Figure 3: Ōtākou Marae, the Wharenuī, Tamatea. Waitangi Day, 2017. Source: Te Rūnanga o Ngāi Tahu**

## 2.1 Mana whenua associations with the Taieri Plain

*Māori occupation of the Taieri area probably dates back a thousand years. The numerous wāhi tapu, wāhi taoka and umu-tī throughout the coastal region, surrounding hills and Taieri Plain, testify to this long-term occupation and use of the area's resources<sup>3</sup>.*

Te Rūnanga o Ōtākou has an enduring relationship with all areas of their takiwā, reflecting the highly mobile nature of their tūpuna (ancestors). The Taieri Plain and its resources were used and settled by Kāi Tahu for generations and contained a number of fortified pā<sup>4</sup>. Traditionally, the rivers and streams in the wider project area were utilised as ara tawhito (traditional travel routes), that provided a connection inland and facilitated the seasonal gathering of food and resources. The Taieri River itself was utilised as the key pathway from inland areas to the ocean. The rivers and streams were also wāhi mahika kai (food gathering places) where tuna (eel) and pātiki (flounder) were gathered. The Kāi Tahu ki Otago Natural Resource Management Plan (2005. P.37) identifies that:

*'[t]he coastal areas provided a bountiful harvest of kaimoana including tītī, seals, mussels and pāua, while the inland waterways provided tuna, kanakana, giant kokopu, pātiki and waterfowl. From the surrounding hills, weka, kukupa and tī-kouka from the cabbage tree were obtained.*

<sup>3</sup> NRMP, p.37

<sup>4</sup> ibid

### **3.0 Description of the proposed activity**

The DCC seeks to construct and operate a Class 1 landfill for municipal solid waste at the designated Smooth Hill site. The landfill would have a projected life span of 55 years with an estimated capacity of 6 million cubic metres and would only accept waste from commercial waste companies or in bulk loads. After adjusting for population growth over the 55 year period, it is estimated that the landfill would receive the current average waste stream of 90,000 tonnes per year. The landfill is designed to allow for temporary surges in the waste stream caused by unforeseen natural events or major development projects.

Public access to the landfill would be prohibited. It would be open for waste deliveries seven days a week and up to 9.5 hours a day. Vehicle access to the site will be from State Highway 1 via McLaren Gully Road and Big Stone Road.

From the SH1 junction at the landfill access road turnoff, McLaren Gully Road would need to be sealed, widened and upgraded to current roading standards, which would include stormwater management upgrades. Traffic will access the site from Big Stone Road from a new access located approximately 350m from the intersection of McLaren Gully Road and Big Stone Road. The access will be used by all operational staff, construction traffic, and waste and leachate trucks. No public access will be allowed. The access into the site is approximately 200m long and will be formed with an 8m wide sealed carriageway and have a lockable gate at the entrance.

Trucks arriving at the site would pass through a main gate to be weighed at a weighbridge. After weighing, trucks would continue to the active landfill operational area for discharge, via the internal access roads through the facilities area, and across the landfill toe embankment. Once the trucks had emptied their loads, they would pass through a wheel wash to ensure any tracked waste was removed and would leave the site through the weighbridge and main gate.

#### **3.1 Landfill Construction**

Construction of the landfill would be carried out in five stages over 55 years. As the Council aims to achieve a significant reduction in waste through its overarching Waste Futures programme, it is possible that not all five stages would need to be completed. This means that either stage one or two could be sufficient to cater for waste for the life of the landfill. Alternatively, the proposed landfill would also have capacity to cater for

increased waste streams due to unforeseeable events such as natural disasters or major developments. Table 1 below sets out the projected life of each stage, excluding the placing of the final cover. These projections are based on the estimated annual average of 90,000 tonnes of waste being transported to the landfill.

**Table 1: Projected life of proposed landfill by stages.**

Stage	Waste void net of daily cover <sup>3</sup> (m <sup>3</sup> )	Waste Tonnage <sup>4</sup> (t)	Placement Period (Years)
1	680,119	544,095	6
2	1,980,340	1,584,272	17.6
3	632,599	506,080	5.6
4	2,264,940	1,811,952	20.1
5	627,850	502,280	5.6
<b>Totals</b>	<b>6,185,849</b>	<b>4,948,679</b>	<b>55</b>

**Figure 4** below shows the location and arrangement of each stage for the proposed landfill and **Figure 5** shows the groundwater pipes and monitoring bores



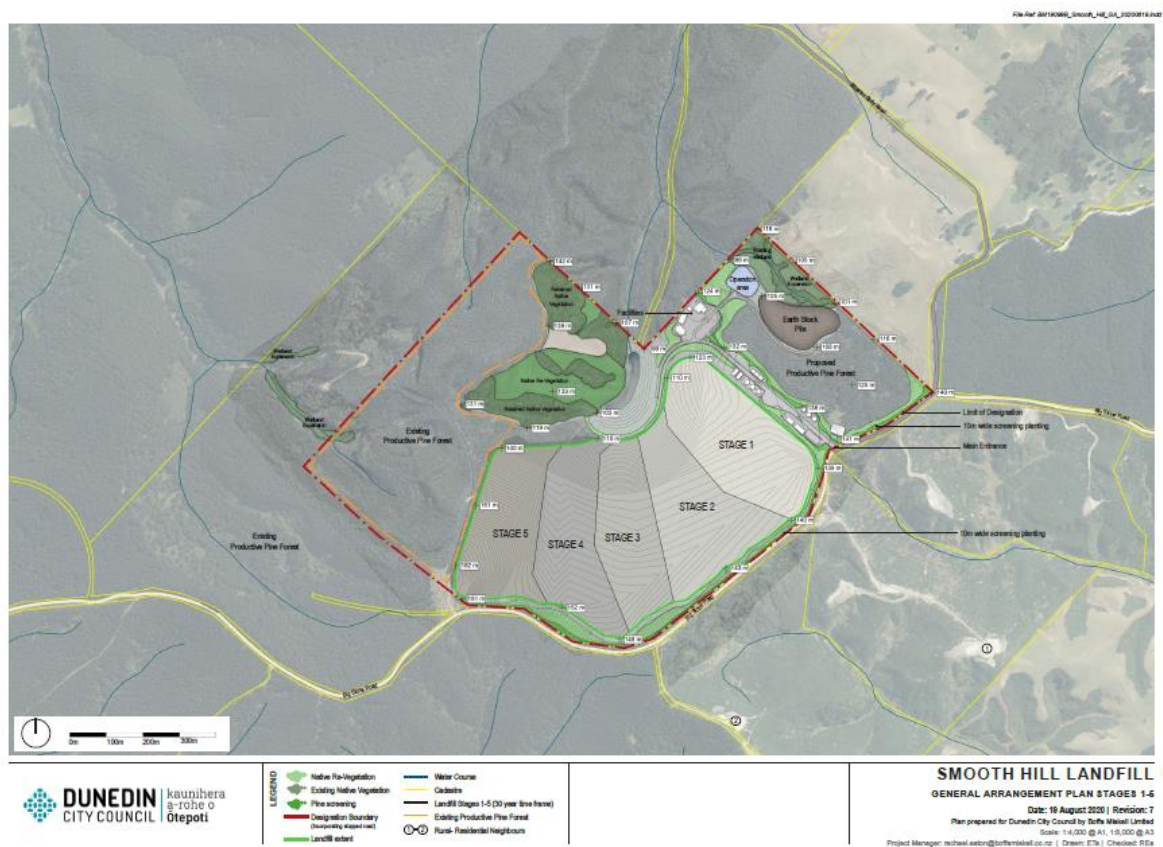


Figure 4: General Arrangement Plan for proposed landfill.

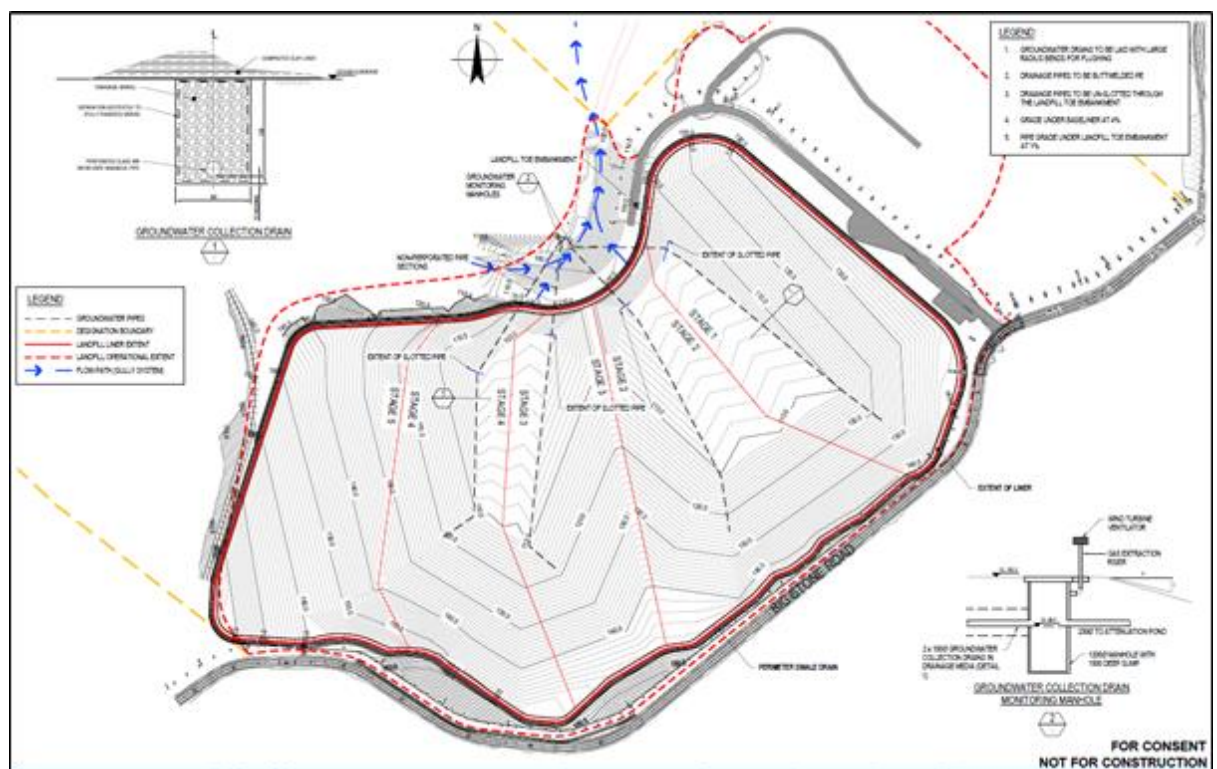


Figure 5: Groundwater Drainage Plan for proposed landfill.

The five stages would include all works required to construct and operate a landfill in accordance with the technical guidelines for disposal to land set out in the 2018 WasteMINZ publication. These would include:

- Earthworks required to access and shape the landfill; including the base grade and final cap.
- Construction of a low permeability lining system to prevent leachate seepage;
- Construction of a leachate collection system above the low permeability lining system;
- Stormwater control around the landfill and other areas of the site with appropriate treatment and attenuation of stormwater before it leaves the site;
- A landfill gas (LFG) collection system to collect LFG from the placed waste; and
- A leachate management system, including leachate storage, tanker loading facilities and leachate treatment facilities.
- Regeneration of vegetation along the margins of waterways and wetlands.

Associated works for the construction of the landfill would include vegetation clearance, topsoil stripping, bore hole drilling for leachate and landfill gas collection system, groundwater monitoring and diversion of surface water around the landfill site.

### **3.2 Leachate Management**

Leachate is the liquid produced through waste degradation and rainwater that percolates through the waste, collecting dissolved and/or suspended matter from the waste as it passes through. All stormwater that comes into contact with waste will be treated as leachate and will not be discharged to the stormwater system.

The amount of leachate generated by the landfill will vary across the different stages and over time. After complete landfill closure, the total leachate predicted from all five stages is approximately 89,588 m<sup>3</sup>/year. The proposed landfill has been designed with a leachate management system that will work to prevent leachate entering the soil and groundwater in the vicinity of the landfill.

The key landfill design components that will manage leachate are listed below:

- Landfill lining system
- Attenuation basin

- Final cap
- Storage and treatment of leachate

### 3.2.1 Landfill lining system

The lining system provides a containment system on which leachate is collected and removed from the landfill. There will be three to four layers of impervious materials including a geomembrane and compacted clay used to line the landfill to prevent leachate seeping into the ground beneath the landfill. This lining system will also be designed so that the leachate drains into the leachate collection system at the base of the landfill from where it will be removed off site for treatment and disposal at a wastewater treatment plant. Further details on the lining system can be found in “Waste Futures Phase 2 - Workstream 3 Smooth Hill Landfill Landfill Concept Design Report”.

### 3.2.2 Attenuation basin

The attenuation basin is designed to control flows from the catchment draining to it that currently discharge to an ephemeral stream in the Ōtokia catchment. The key role of the attenuation basin is to slow the flow of the water entering it. The attenuation basin will be primarily used to manage stormwater but can also be used in an emergency to store leachate. The attenuation basin has less than 20,000m<sup>3</sup> capacity.

### 3.2.3 Final cap

The primary purpose of the final cap on the landfill surface is to prevent seepage of water into the waste and the resulting generation of leachate by acting as an impervious cover over the top of the landfill, in addition, the cap:

- Minimises the escape of landfill gas (LFG)
- Provides a barrier between the landfill waste and any future users of the site
- Provides a suitable growing medium for appropriate vegetation

The cap comprises 500mm of intermediate cover directly on top of the landfill waste, then a 600mm layer of clay and on the top at least 150mm of topsoil.

### 3.2.4 Storage and treatment of leachate

Leachate that reports to the leachate collection system accumulates in the leachate sump where pumps deliver the leachate to holding tanks. Leachate will then be tankered off site to the council sewerage system connection in Brighton which then conveys the leachate to the Green Island Wastewater Treatment Plant. At an appropriate point of site development (most likely when Stage 1 has been completed), a pipeline will be constructed from the site to the nearest connection into the WWTP system at Brighton,

approximately 7.5 km to the north east of the site. This is not part of the application and will be considered at a later date.

		Stage 1	Stage 1 - 2	Stage 1 - 3	Stage 1 - 4	Stage 1 - 5
Total average annual leachate generation (m <sup>3</sup> )		29,978	48,107	58,503	75,045	87,283
Total leachate predicted (as % of rainfall)	%	36%	32%	30%	29%	28%
Average leachate per day	m <sup>3</sup>	84	139	178	228	271
Trucks per day (with 20 m <sup>3</sup> tanker)	No.	4	7	9	11	14

**Table 2: Average Leachate Removal by tanker.**

### 3.2.5 Leachate leakage

While all these measures are designed to prevent leachate from entering the environment, it is reasonable to assume that some leachate will make its way into the soil and groundwater surrounding the landfill. Potential leachate leakage has been modelled using a conservative/worst-case scenario approach. The maximum leachate leakage is predicted to occur during operation of stage 5 of the landfill, with an estimated leakage rate of 2,950 litres/year (3.0 m<sup>3</sup>/year) (generated from operational stage 5 and closed stages 1, 2, 3 and 4). The predicted total leachate leakage from all stages after landfill closure is approximately 1,884 litres/year (1.9 m<sup>3</sup>/year).

## 3.3 Stormwater Management

Stormwater management and control will be required during the construction, operation and closure phases of the landfill. This is to reduce the amount of leachate produced by the landfill and prevent sedimentation in nearby waterbodies.

### 3.3.1 Construction Phase

A key issue during the construction phase is the exposed surface with the potential to generate suspension of sediments in runoff discharging to the downstream valley and Ōtokia Creek.

Controls will include:

- Perimeter swale drain: A cut off channel will be provided around the perimeter of the immediate construction phase to intercept flows and divert these away from the construction area. The perimeter drain will be constructed progressively as the landfill stages are developed. The perimeter swale drain will have measures to

prevent scour in places. Channel scour protections will vary dependant on the design velocity and will range from grass only channel, through reinforced earth (grass root matting) through to formal rock ballast rip-rap.

- A sediment control pond will be constructed at the immediate base of the excavation for each phase of the landfill and provide primary treatment of runoff removing sediment from discharges that then flow through to the attenuation basin. There will be a sediment control pond for each stage of the landfill.
- An attenuation basin will be constructed as part of the long-term management for the site managing increased runoff from the landfill site over its lifetime. Almost all stormwater from the landfill will report to this basin. The basin will be located at the downstream end of the landfill site and will be constructed at commencement of the landfill development works to manage increased flows associated with the exposed surface and to provide an additional level of treatment of runoff prior to discharge. The attenuation basin will have a capacity of less than 20,000m<sup>3</sup> and will be empty except when there is a rainfall event. The key role of the attenuation basin is to slow the flow of stormwater. The basin has a low flow outlet pipe to allow the stormwater to move through the basin slowly. This pipe can be shut off if necessary, e.g. if leachate is found to be entering the basin. The base of the basin will be unlined to allow seepage of stormwater into the groundwater system.
- Sediment control for Stockpile: Stormwater runoff from the stockpile area will be managed through a separate stormwater control system.
- Sediment control for access road development: The access road will be constructed at the commencement of the landfill development. A series of sediment control devices and practices will be installed for this temporary works in accordance with the requirements of the Otago Regional Council.
- Stage area limitation: Excavation will be carried out to limit the area exposed at any one time and following excavation surfaces will be protected as soon as possible. This may take the form of grassing/hydroseeding or the use of protective matting.
- Localised works will be site specific such as management measures for the road upgrade works, which may include the use of filter socks or temporary silt dams in channels while works are under construction and there is potential for elevated sediment concentrations in runoff.

### 3.3.2 Operation Phase

The operational phase involves the opening of new cells as required, the progressive relocation of access routes over the landfill footprint and application of cover soils once that portion of the cell is full. The controls for the opening of new cells are similar to those outlined for the preliminary works including extension of the perimeter swale drain around the extent of the new works, development of new sediment control ponds and the development of drainage to the attenuation basin.

The key controls for the covering and closure of filled cells are the grading and surface drainage of the impermeable capping to the perimeter swale drain flowing to the attenuation pond and the establishment of a vegetative cover over the surface to reduce runoff volumes and stabilise the surface to control sediment discharges

### 3.3.3 Closure/Closed Phase

This phase includes the final covering and closure of the landfill and the post-closure land use.

The closure phase controls will be similar to those for the cell closure discussed in the operational phase above with the addition of localised short-term sediment control measures for the removal of long-term infrastructure such as hardstand areas and building platforms. Landfill capping and therefore closure of the cell will be progressive. It is expected that at any point in time, the final cap will be placed, and vegetation established where the design levels are reached. Areas that are not finally capped are limited to the active portion of the landfill cell and areas that are not active and have not reached the design level will have intermediate cover placed.

The closed landfill will have an ongoing stormwater management requirement. This includes the ongoing drainage from the capping and the management of increased flows together with water quality monitoring. While this does not require the construction of additional control measures it does require the ongoing retention and maintenance of the perimeter swale drain and the attenuation basin.

A site-specific stormwater management plan will be prepared which will form part of the overall operation plan for the landfill. The stormwater management plan will provide a more detailed assessment of management requirements, the measures to be adopted, and design of the controls. The plan will follow good practice and will utilise relevant guidelines and best practice.



## **4.0 Anticipated effects of the proposal**

Technical reports of particular relevance provided to Aukaha to inform this CIA are:

- Smooth Hill Landfill – Landfill Concept Design Report
- Smooth Hill Landfill – Ecological Impact Assessment
- Smooth Hill Landfill – Archaeological Assessment
- Smooth Hill Landfill – Hydrogeological Impact Report
- Smooth Hill Landfill - Landfill Gas Assessment and Concept Landfill Gas Management Measures
- Smooth Hill Landfill – Air Quality Assessment

### **4.1 Leachate – Landfill Concept Design Report**

#### **4.1.1 Leachate Potential Effects – Landfill Concept Design Report**

This technical report assesses the design of the landfill and of particular interest to mana whenua, the engineering solutions that will be put in place to mitigate or avoid leachate leakage and manage stormwater runoff and the associated effects on the downstream receiving environment.

The primary negative effects of leachate entering the environment relate to contaminants from the leachate entering soil and groundwater. This negatively affects the quality of the groundwater and its mauri. It can also affect the microorganisms living in the soil and water. Effects on water can also further affect aquatic mahika kai and taonga species in the catchment.

These effects on water and ecology are described in sections 4.3 and 4.4.

#### **4.1.2 Leachate Mitigation Measures**

The key measures to reduce the potential negative effects of leachate have been focused on preventing leachate from entering the environment. This is an approach that is supported by mana whenua, who prefer that negative effects are avoided.

Despite the leachate management measures in place, it is appropriate to assume that some leachate will make its way into the soil and groundwater surrounding the landfill.



DCC are currently not proposing to mitigate the effects of this leachate as it is likely to be in small quantities that will be diluted by the water it enters into. Mana whenua do not agree with this approach. Discharges of contaminants from leachate, no matter how small, should be mitigated. Recommendations on appropriate mitigation options are discussed in section 8.0.

## **4.2 Stormwater**

### **4.2.1 Stormwater Potential Effects**

Potential negative effects from stormwater include the creation of leachate, and the movement of sediment laden stormwater into waterbodies. The negative effects of leachate are discussed in section 4.1.1. Where sediment enters waterways it can have negative effects on water quality and aquatic flora and fauna. These effects are discussed in sections 4.3 and 4.4.

### **4.2.2 Stormwater Mitigation Measures**

The key measures to reduce the potential negative effects of poor stormwater management have been focused on preventing sediment-laden stormwater from entering the environment, and preventing stormwater entering the landfill and creating leachate. This is an approach that is supported by mana whenua, who prefer that negative effects are avoided.

No further stormwater mitigation measures have been proposed by the applicant.

## **4.3 Groundwater and Surface Water**

### **4.3.1 Groundwater and Surface Water – Potential effects**

The landfill will be lined to prevent water entering the soil and groundwater below it. This means that there is expected to be a reduction in the amount of groundwater beneath the landfill. However, storm water from the site will be stored in an unlined attenuation basin, and it is expected that this stormwater will contribute to groundwater as it leaches out of the attenuation basin. It is expected that this will provide a greater groundwater baseflow to Ōtokia Creek downstream of the landfill.

If this stormwater is clean, then the groundwater quality may improve. Currently the groundwater has high concentrations of nitrate-N (possibly due to forestry in the surrounding area). With the change in land use from forestry to a landfill, nitrate-N concentrations may decrease, representing an improvement in groundwater quality.

Modelling predicts that concentrations of other contaminants entering groundwater will be similar to current concentrations.

#### 4.3.2 Groundwater and Surface Water Mitigation Measures

Water quality is expected to improve as a result of the land use change from forestry to landfill, and baseflows in the Ōtokia Creek are expected to be increased. Therefore DCC is not proposing any mitigation measures related to effects on surface water or ground water hydrology. Water quality monitoring will be undertaken to ensure that the measures designed to protect water quality are effective. A description of the proposed monitoring is provided in the AEE.

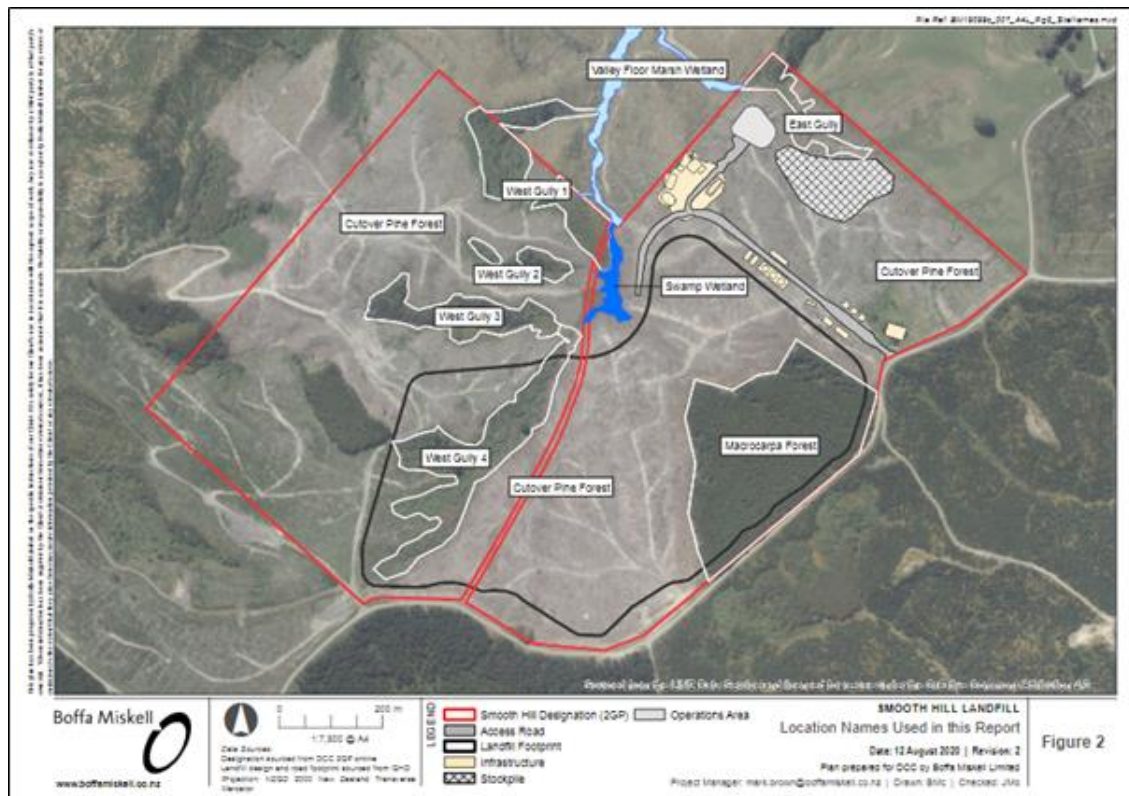
### 4.4 Ecological Impact Assessment

#### 4.4.1 Ecological Impact Assessment - Potential Effects

The Ecological Impact Assessment (IA) addresses the potential impacts of the landfill construction and operation on vegetation, birds, herpetofauna (eg, lizards) and waterways in the proposed project area. In the area affected by the project, mana whenua have a particular interest in:

- Wetlands: including Lower Ōtokia Creek Marsh which is a Regionally Significant Wetland.
- A tributary of Otokia Creek that receives flow from gullies within the designated area. Otokia Creek flows into the sea at Brighton Beach.
- Kārearea (eastern falcon), a native species present on the proposed site. An area of kānuka forest on the proposed site is a significant breeding area for the Kārearea. They are categorised as an At-Risk Recovering species of moderate ecological value. Other native bird species that have been observed in the proposed project area included: Tui, Kāhu (Harrier hawk), Welcome swallow, Pīwakawaka (South Island fantail), Riroriro (Grey warbler), Karoro (Black-backed gull), Kereru, Tauhou (Silvereye), Pīpiwharauoa (Shining cuckoo), and Pūtangitangi (Paradise shelduck).
- Southern grass skink, a native lizard species. Much of the vegetation that covers the site, are likely to provide habitat for this species. The southern grass skink are also categorised as an At Risk – Declining species of high ecological value. There are also two other lizard species endemic to the South Island that might have habitats on the site. They are the McCann's skink and the jewelled gecko.
- An interconnected area of gully forest, treeland, scrub habitats and flaxland/shrubland wetland habitats of ecological significance as significant

vegetation and significant habitat of indigenous biodiversity. The separate gullies are referred to as West Gully 1, 2, 3 and 4 in the Ecological IA Report. West Gully 4 contains large-leaved pohuehue, makomako, kōtukutuku, himalayan honeysuckle treeland, rautahi – Yorkshire fog sedgeland and an immediately fringing grassland. West Gully 3 contains Kānuka forest and harakeke (gorse) and rautahi – purei flaxland. West Gully 2 contains patches of kānuka forest and rautahi – yorkshire fog sedgeland. Small areas of exotic radiata pine – gorse, shrubland with a few indigenous trees connect the forest and sedgeland patches to each other and to the swamp wetland. The swamp wetland then contains harakeke – gorse, rautahi – pūrei flaxland and rautahi – Yorkshire fog sedgeland. Large-leaved pohuehue and gorse scrub fringe the swamp wetland and connects it to West Gully 1. **Figure 6** below shows the location of the gullies and ecological features within the designated area.



**Figure 6: Ecological features within Smooth Hill Landfill footprint and designation area.**

The Ecological Impact Assessment states that vegetation removal will have a very low ecological effect as the vegetation types present in the clearance area are small in comparison to their extent in the wider area. However, some vegetated areas are likely to provide habitats for lizard species, specifically the southern grass skink that has a high likelihood of presence. As such, the vegetation clearance and general works during construction could have adverse effects on these lizard species. Construction during the

breeding period of the Kārearea (eastern falcon) could also result in adverse effects on any Kārearea that are present at the time.

In terms of freshwater values, the Ecological Impact Assessment states that these are sparse as the watercourses are of an ephemeral nature. Two watercourses are shown on the topographical map to pass through the proposed project area. However, no defined channels were observed on the sites. It was noted that the watercourses may have surface flow during rainfall events only and that the watercourses did not provide any intermittent or permanent habitat for freshwater macroinvertebrate or fish fauna. The Assessment states that with the absence of surface flow and wet conditions, these ephemeral watercourses will not provide habitat for indigenous fish, aquatic invertebrates, or indigenous aquatic plants that depend on flowing waterbodies.

The swamp wetland and valley floor marsh wetland near the designated area forms part of the headwaters of the Otokia Creek catchment, which flows to the sea at Brighton Beach. This tributary was observed to be perennial and likely to have surface water present all (or most) of the year. It is likely that banded kōkopu, possibly eels and kēkēwai (freshwater crayfish) may be present in the tributary downstream of the designation site.

Sediment in a stream is natural, but if sediment levels get too high, it negatively affects mahinga kai. Sediments in runoff can transport contaminants such as nutrients, bacteria, and toxic chemicals into waterbodies. These contaminants negatively affect mahika kai and taonga species, and the habitats they live in. Increased suspended sediment also reduces water clarity. This means there is less light in the water for plants that need light to grow and fish that need to be able to see to hunt for food. Sediment can also clog gills, making it difficult for a fish to breathe. Sediment can smother the river bed, which affects habitat and food resources for fish and aquatic insects. An increase in the amount of sediment deposited on the river bed can also significantly change the flow and depth of a river over time and infill estuaries.

#### 4.4.2 Ecological Impact Assessment – Mitigation Measures

The following methods have been proposed to mitigate the effects on ecological values described above.

- Implementation of a Wetland Restoration Plan and Terrestrial Vegetation Plan

Measures that will be addressed through these plans include the expansion and enhancement of habitats such as those that will be removed. Areas within the designation area outside the landfill footprint have been identified for this purpose.

- Implementation of a Pest Management Programme
- Preparation and implementation of a Falcon Management Plan
- Preparation and implementation of a Lizard Management Plan

This will offset the adverse effects on vegetation, avifauna and herpetofauna caused during the landfill construction through providing measures to enhance these values.

## 4.5 Archaeological Assessment

### 4.5.1 Archaeological Assessment – Potential Effects

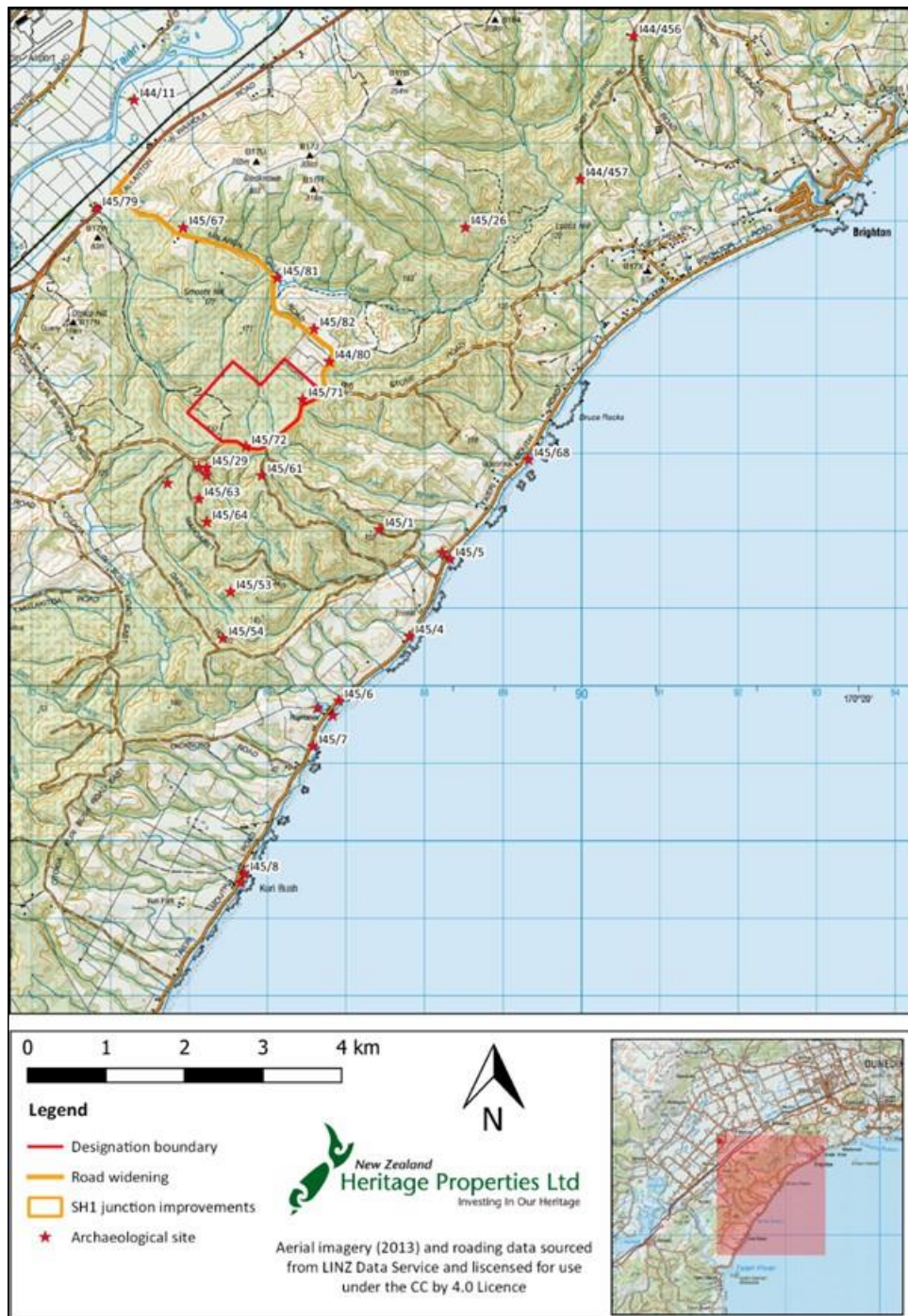
Site and enabling works will require considerable excavation. The landfill development requires earthworks involving 1.9 million m<sup>3</sup> of cut and 0.85 million m<sup>3</sup> of fill.<sup>5</sup> Construction of the roading upgrades outside of the site are anticipated to require approximately 124,000m<sup>3</sup> of cut, and 109,000m<sup>3</sup> of fill. This scale of activity is significant and has the potential to impact on archaeological material. The Archaeological Assessment identifies 27 archaeological sites in the Ōtokia District, as shown by **Figure 7**. Of these sites, 15 are identified as being associated with mana whenua activity. Most are situated along the coastline, one is on the Taieri River, and a small concentration of sites situated immediately southwest of the project area (I45/27, I45/28, and I45/29). These sites record pipi, cockle and gastropods and join eleven other sites that record midden or ovens.<sup>6</sup>

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<sup>5</sup> Boffa Miskell & GHD, 2019 in prep.

<sup>6</sup> Archaeological Assessment Page 25





**Figure 7: Recorded archaeological sites within Ōtokia District**

The small cluster of three sites at I45/29 identifies sites I45/27, I45/28 and I45/29 which are all of mana whenua origin. The other areas within the designation are of pre-1900 European origin, relating to the original homestead structures. The table below identifies the range of archaeological sites located in proximity to the site. Of interest from a cultural perspective are the midden sites (I45/27-29), situated 400m away from the designated site, a pā site (I45/11) located over a kilometre away, and another midden site nearly 2km away.

**Table 3: Previously recorded archaeological sites within 2km of the project area.**

NZAA Site No	Distance from Project Area	Site Type	Site Description
I45/71	Within project area	Historic – Domestic	Timber historic homestead and reservoir.
I45/72	Within project area	Historic – Domestic	Earth walled building (possibly mud-brick).
I45/67	50m north	Agricultural/pastoral	1890s homestead associated with Peter McLaren the Younger.
I45/61	350m south	Agricultural/pastoral	Sod wall and associated drains.
I45/28	400m south	Midden	Midden comprising pipi, cockle, and gastropods exposed on walking track for 1.25m.
I45/29	400m south	Midden	Shell scatter comprising pipi and cockle.
I45/27	456m south	Midden	Midden comprising pipi, cockle and gastropod shell exposed in channel. Adze found in site when ditch constructed.
I45/63	800m south	Agricultural/pastoral	Sod wall.
I45/55	850m south	Agricultural/pastoral	Sod wall enclosure demarcating Section 1, Section 45, Block IV, Ōtokia S.D. on either side of Flax Stream.
I44/11	1050m north	Pā	Pā a Tu Pare Taniwha. Site associated with Ngāti Kahunguni.
I45/64	1050m south	Agricultural/pastoral	Sod walls in T-Shape.
I45/1	1850m southeast	Midden/oven	Three or four ovens around 2m in diameter.

The significance of an archaeological site is determined by, but not limited to, its condition, rarity or uniqueness, contextual value, information potential, amenity value, and cultural association.<sup>7</sup> The scattering of sites in the vicinity suggests the broad area was well used by mana whenua and further archaeological sites could be discovered.

To mitigate effects on archaeology, the site was categorised into archaeological hazard zones as detailed below:

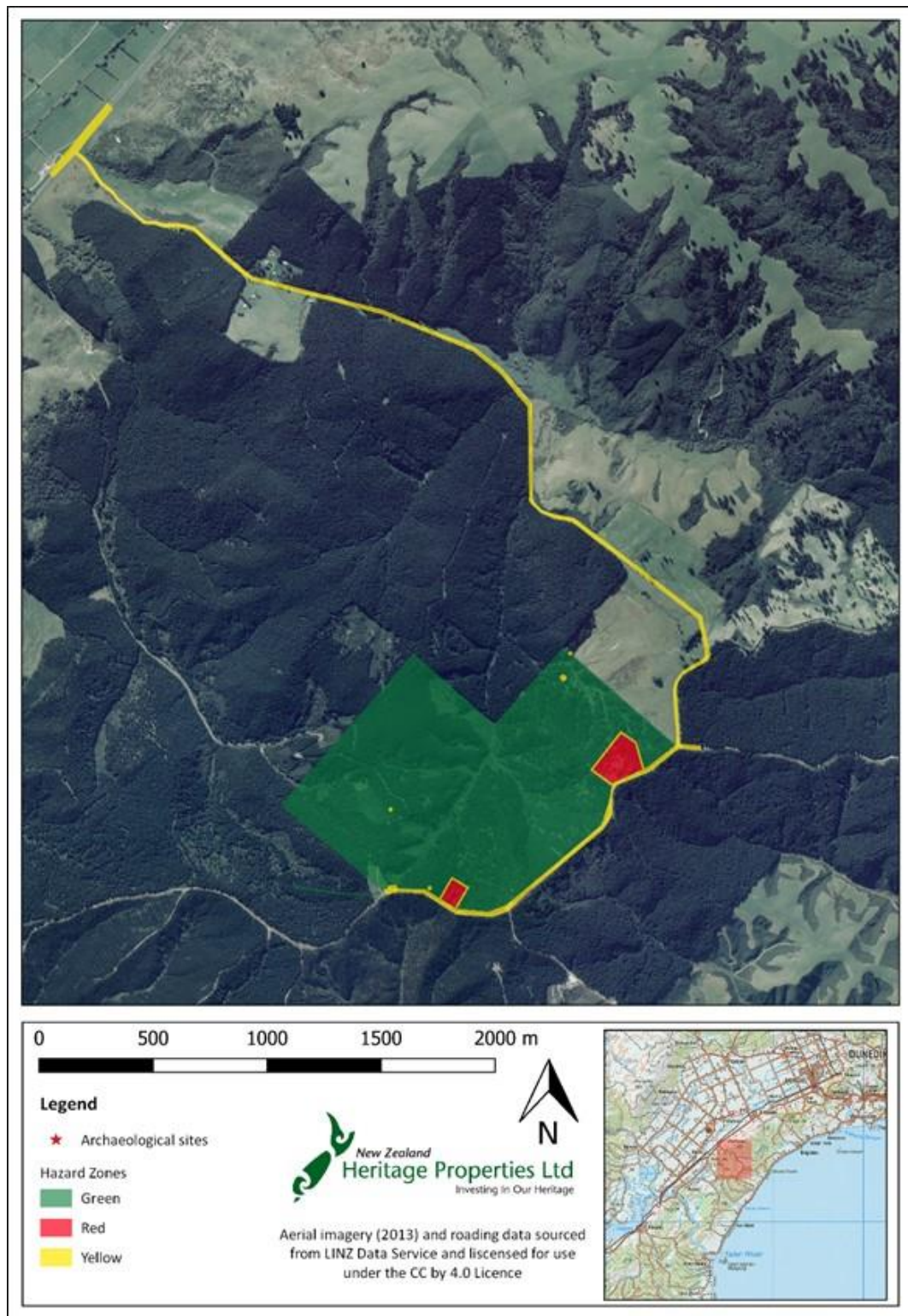
- The **red zone** represents a high risk of encountering archaeological features and materials,
- The **yellow zone** represents a moderate risk of encountering archaeological features and material, and
- The **green zone** represents a low risk of encountering archaeological features and materials.<sup>8</sup>

**Figure 8** below illustrates the zones. The majority of the designation site is categorised as low risk (green), with the road upgrades being moderate risk (yellow) and known sites being high risk (red).

<sup>7</sup> Archaeological Assessment Page 82

<sup>8</sup> Archaeological Assessment Page 85





**Figure 8: Archaeological Hazard Zones identified for Smooth Hill Landfill**

In terms of cultural risks to mana whenua, the yellow zones appear to be the most important as they are the most likely areas to contain middens associated with mana whenua occupation of the area.<sup>9</sup>

<sup>9</sup>Archaeological Assessment Page 86

#### 4.5.2 Archaeological Assessment - Mitigation Measures

Proposed mitigation methods for the yellow risk areas involves an archaeologist being alerted to works occurring within the yellow zone. While works in the yellow zone require no formal archaeological monitoring, on-call protocols (OCP) shall be adhered to. If suspected archaeological material is encountered at any stage and an archaeologist is not present, works must stop in the immediate area of the find (25 m for burials, 10 m for all other finds), and the approved archaeologist must be alerted in the first instance to ascertain whether it is archaeological and if so, to record the material.<sup>10</sup>

### 5.0 Statutory Framework

There are a number of statutory provisions that apply to this proposal, of which the Resource Management Act 1991 is of key significance. Of similar significance is the iwi planning document being the Kāi Tahu ki Otago Natural Resource Management Plan 2005. The following section provides a brief description of these two frameworks, with specific provisions of relevance attached in the appendices.

#### 5.1 Resource Management Act (RMA) 1991

The management of natural and physical resources in New Zealand is governed by the Resource Management Act (RMA) 1991. Part 2 of the RMA specifically speaks to the importance of recognising takata whenua and takata whenua values, including a requirement to:

- recognise and provide for the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga (section 6(e));
- have particular regard to kaitiakitanga and the ethic of stewardship (sections 7(a) and 7(aa)); and
- take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi) (Section 8).

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<sup>10</sup>Archaeological Assessment Page 86

## 5.2 Kāi Tahu ki Otago Natural Resource Management Plan 2005

The NRMP is the operative Iwi Management Plan which sets out Otago Papatipu Rūnaka aspirations in relation to natural resource management in their *takiwā* (area). The NRMP is founded in the concept of 'Ki Uta ki Tai' (from the mountain to the sea) which emphasises the holistic te ao Māori (Māori world view). Ki Uta ki Tai will be elaborated on in more detail in Section 6 when mana whenua values are addressed.

The relevant provisions of the NRMP are set out in Appendix D.

## 6.0 Kā Uara : Mana Whenua Cultural Values

The Smooth Hill consent applications have the potential to impact on a range of cultural values. This section provides an overview of the cultural values identified by mana whenua as a relevant to the project, and the relevant issues, objectives and policies from the Kāi Tahu ki Otago Natural Resources Management Plan. Full wording of the relevant objectives and policies appears in Appendix D. Section 8 provides an assessment of these values, objectives and policies against the proposal, and recommendations for dealing with impacts on cultural values.

Mana, mauri and whakapapa are core values which underpin the Kāi Tahu worldview with respect to this project. These values are interconnected and the degradation of one value can affect other values.

### 6.1 Mana

Mana means the 'authority' or 'prestige' that mana whenua hold over their respective regions and is often understood to be a spiritual force bestowed upon mana whenua throughout generations by atua (gods). The possession of mana means that mana whenua have the 'authority' to make decisions over the whenua (land) and the moana (sea) within their takiwā. Historically, mana was attained through numerous circumstances such as umu takata (conquest) or mahi taunaha (discovery and naming of the land and resources) (Pōtiki, 1996). All development projects that occur within tribal territories are expected to recognise and uphold the mana of mana whenua. Mana whenua are Council's Treaty Partner. The test of partnership is the ability to influence critical decisions.

The KTKO Natural Resource Management Plan 2005 addresses mana in the five overall objectives which are set out at the start of the Plan in Section 5.2. These overall objectives apply to the whole of the Otago Region and assert that the mana of Kāi Tahu be upheld in the management of all natural, physical and historic resources.

## 6.2 Mauri

Mauri is the 'life force' or 'life principle' of a place or thing. Mana whenua believe that there is an active phenomena within everything and thus, whether living or inanimate, all things possess mauri. The Kai Tahu Ki Otago Natural Resource Management Plan states that primary management principle is the protection of mauri and the life-giving essence of an ecosystem from desecration. Thus, this objective is woven throughout all the policies and objectives within the Plan.

*'Mauri is imbued in all things and is a special power derived from the Supreme Being. At birth, the two parts of body and wairua are joined together as one by the mauri. On death the mauri is no longer able to bind these elements together and the physical and spiritual parts are separated. The forest, waters, the life supported by them, together with natural phenomena such as the mist, wind and rocks, possess a mauri or life force.'*<sup>11</sup>

Mauri is often used as a benchmark when measuring the health of the environment. Assessing cultural effects involves examining the effects on mauri in the short and long term.

## 6.3 Whakapapa

*Whakapapa is central to our identity and describes a familial relationship in which manawhenua are enveloped through custom and tradition with their lands, waters or sea. It is a bond that is reciprocal, manifested in our language through waiata, pūrākau, whakataukī and place names.*<sup>12</sup>

Whakapapa is often referred to as 'genealogy' and is at the core of how mana whenua express their identity. The notion of whakapapa extends beyond familial relationships and ties amongst people. Its significance is highlighted by Pōtiki (1996):

*Creation and the introduction of all elements into the universe is genealogical or whakapapa-based meaning that ultimately all things in the*

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<sup>11</sup> NRMP, Page 27

<sup>12</sup> NRMP, Page 29

*universe are interconnected and they also share a single source of spiritual authority.*

From the stories of creation, to how mana whenua introduce themselves through their pepeha (introduction), to all parts of the natural and spiritual environment, everything in existence is acknowledged and connected through whakapapa.

Whakapapa also enforces a hierarchy where those who hold a higher whakapapa status inherit higher mana within their takiwā (area). Whakapapa gives the manawhenua over the project area to Te Rūnanga o Ōtākou. Whakapapa establishes the ancestral rights which give mana whenua the mana and kaitiaki responsibilities over their takiwā. A key way in which whakapapa can be understood in the context of projects is by recognising and respecting ancestral landscapes, associations and place names. It can also be applied to understanding and regenerating biodiversity with whakapapa to an area.

<b>Relevant issues relating to whakapapa</b>
<ul style="list-style-type: none"><li>• There is a prevailing view that Kāi Tahu ki Otago interests are limited to Statutory Acknowledgements, Tōpuni, and Nohoaka sites.</li><li>• Land management regimes have failed to adequately provide for Kāi Tahu ki Otago interests in cultural landscapes.</li><li>• Extension and maintenance of infrastructure (e.g. transport, telecommunications) can affect cultural landscapes.</li><li>• The lack of use of traditional names for landscape features and sites.</li><li>• The building of structures and activities in significant landscapes.</li><li>• Inability to address indirect and/or cumulative effects means that many issues of significance to Kāi Tahu ki Otago, such as linkages, are not addressed during resource management processes.<sup>13</sup></li></ul>



### Relevant NRMP Policies

The policies related to whakapapa are largely addressed in Section 5.6.3 Cultural Landscapes. These policies address the importance of identifying and protecting both the tangible landscape features of significance to Kāi Tahu as well as the intangible features such as place names. They also address the potential for activities such as earthworks, roading, and the construction of landfills and other structures to adversely

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<sup>13</sup> NRMP Section 5.6.2 Cultural Landscapes General Issues

affect the values that Kāi Tahu hold for their ancestral landscapes which they whakapapa to.

## 6.4 Ki Uta ki Tai

Ki Uta ki Tai means ‘from the mountains to the sea’ and emphasises interconnectedness. It is a concept that *‘emphasises holistic management of the interrelated elements within and between catchments, from the air and atmosphere to the land and the coastal environment, [whereby] implementation will require a collaborative approach’*<sup>14</sup>. Ki Uta ki Tai is the premise on which the Kai Tahu Ki Otago Natural Resource Management Plan is built. The second overall objective of the Plan is that the concept of Ki Uta Ki Tai is applied to the management of all natural resources across the Otago Region. This principle is also linked to kaitiakitaka.

Relevant Issues relating to Ki Uta ki Tai
<i>Taku Tai Moana Me Wai Māori Issues</i> <ul style="list-style-type: none"><li>• Land use activities adjoining the coast adversely affect localised coastal water quality, for example from devegetation and poor riparian management.</li></ul>

### Relevant NRMP Policies relating to Ki Uta ki Tai

#### *Discharges:*

8. To require that leachate from disposal sites adjacent to coastal environments is monitored and contaminated environments rehabilitated.

## 6.5 Kaitiakitaka

Kaitiakitaka is the intergenerational and inherited responsibility to support and protect people, the environment, knowledge, culture, language and all resources on behalf of future generations. It is often translated to include the concepts of ‘guardianship’ or ‘stewardship’. The term is also recognised in Section 7(a) of the RMA 1991. However, mana whenua see this as a limited expression of what kaitiakitaka is. For Kāi Tahu ki Otago, ‘kaitiakitaka is not only about the physical resources, it is about being mana whenua and maintaining a relationship to the spiritual dimension and influences of wairua and tapu.’<sup>15</sup>

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<sup>14</sup> NRMP, Page 30.

<sup>15</sup> NRMP, Page 22



<b>Relevant NRMP Issues relating to Kaitiakitaka</b>
<ul style="list-style-type: none"><li>• The ability to practice kaitiakitaka has been ‘curbed’ ‘as a result of the changing social order post treaty’ and the lack of recognition of the mana of Māori and mana whenua in the ensuing legislation.</li><li>• Private property rights have limited access to places and resources to practice kaitiakitaka, however, the obligation and responsibility on mana whenua remains.</li></ul>



Relevant NRMP Policies relating to Kaitiakitaka

Kaitiakitaka is addressed in the overall objectives of the NRMP in Section 5.2. The first objective seeks to establish the rakatirataka and kaitiakitaka of Kāi Tahu in the Otago Region and ensures that this is recognised and supported throughout all natural, physical and historic resource management issues in the region.

## 6.6 Mahika kai

Mahika kai is a cornerstone of Kāi Tahu culture. Mahika kai is the gathering of foods and other resources, the places where they are gathered and the practices used in doing so. Mahika kai is an intrinsic part of Kāi Tahu identity. It has formed the basis of the Kāi Tahu economy for hundreds of years, and remains at the core of tribal economic development today.

Mahika kai relates not only to the ability to feed whānau, but to also feed visitors and show the highest level of hospitality (manaakitaka). The ability to do this bestows mana on the mana whenua and when mahika kai resources are scarce, the mana is depleted in the eyes of the visitor. Kaihaukai refers to the exchange of specialty foods by hapū of other rohe. Hapū would come together following the return from a harvest to exchange the specialty foods of their respective areas. Mahika kai heavily relies on a healthy functioning ecosystem including access to these sites and areas. A good resource is an indicator of a healthy ecosystem.

Historically, mana whenua lived a hunter-gather lifestyle as traditional crops could not easily grow in the colder weather in the south. This meant that they would travel great distances following seasonal food routes. Kā rūnaka treasure the ability to gather these foods and resources in the same places as their tūpuna (ancestors).



### Relevant Issues relating to Mahika Kai

- Point and non-point source discharges impacting on mahika kai.
- Access for Kāi Tahu ki Otago to mahika kai sites.
- Loss of indigenous biodiversity in the region.
- Loss of species of particular importance.
- Loss of indigenous flora and fauna remnants and lack of co-ordinated management of native corridors.
- Poorly managed landfills, industrial sites and waste disposal sites have created contaminated soils.
- Kā Papatipu Rūnaka believe that inappropriate use and development will adversely impact on:
  - the diversity & abundance of terrestrial and aquatic species;
  - the ability to access & gather mahika kai resources; and
  - the ability to educate future generations in significant mahika kai practices<sup>16</sup>

### Relevant Policies relating to Mahika Kai

The NRMP Mahika Kai and Biodiversity policies promote the uptake of catchment-based management programmes. The policies also advocate for the involvement of Kāi Tahu in the management of both introduced and indigenous mahika kai and express the importance of protecting and enhancing mahika kai values and the physical access of Kāi Tahu to important sites. The policies have a particular focus on the protection of indigenous fish and their habitats, particularly from hazardous operations and the use, transportation and storage of hazardous substances. The policies also cover the protection and enhancement of existing wetlands as well as the reinstatement of wetlands that have been neglected.

## 6.7 Wai Māori

*Water plays a significant role in our spiritual beliefs and cultural traditions. The condition of water is seen as a reflection of the health of Papatūānuku<sup>17</sup>.*

Water is central to Te Ao Māori (the Māori worldview). There can be no life without water, as expressed through the whakataukī (proverb) Ko te wai te ora o ngā mea katoa - water

<sup>16</sup> Section 5.5.2 Mahika Kai and Biodiversity General Issues

<sup>17</sup> NRMP, p.59

is the life giver of all things. All waterways sustain some form of life and are valued as sources of mahika kai, mana whenua creation stories, settlement and as access or travel routes. Mana whenua consider water a taoka (treasure) left to them by their tūpuna and seek to protect waterways for future generations.

Protecting and enhancing the wellbeing of all bodies of water is directly related to mana whenua's role as kaitiaki. The degradation of water bodies through land use activities is considered to have resulted in 'material and cultural deprivation'.<sup>18</sup>

<b>Relevant Issues relating to Wai Māori</b>
<ul style="list-style-type: none"> <li>• Current water management does not adequately address Kāi Tahu ki Otago cultural values.</li> <li>• Cross mixing of water.</li> <li>• Deteriorating water quality.</li> <li>• Lack of consideration given to Kāi Tahu ki Otago cultural values in water research</li> </ul> <p><b>Discharges:</b></p> <ul style="list-style-type: none"> <li>• Cumulative effects of discharges.</li> <li>• View that due to dilution rates, discharges to water have little or no effect.<sup>19</sup></li> </ul> <p><b>Land Management and Use including:</b></p> <ul style="list-style-type: none"> <li>• Draining of wetlands.</li> <li>• Lack of proper riparian management throughout an entire catchment.</li> <li>• Sedimentation from land use and development.</li> <li>• Accidental discovery of cultural materials or sites from changed land use</li> </ul>

#### Relevant Policies relating to Wai Māori

The Wai Māori policies express the cultural importance of water to Kāi Tahu and the importance of protecting and restoring the mauri of all water. The policies address the effects of discharges and land use on water and require the regular monitoring of all discharges and revegetation with locally sourced indigenous plants for all disturbed areas. Wai Māori policies also oppose the draining of wetlands and stipulate that all wetlands are to be protected.

<sup>18</sup> Ibid.

<sup>19</sup> Section 5.3.2 Wai Māori General Issues

## 6.8 Hau

Hau refers to maintaining healthy air quality and refraining from activities that have immediate and prolonged negative impacts on the quality of air. This is also an important part of kaitiakitaka and the holistic approach to resource management highlighted by 'Ki Uta ki Tai'.

Issues related to Hau
<ul style="list-style-type: none"><li>• The cultural impacts of air pollution and discharges to air are poorly understood and seldom recognised.</li><li>• Discharges to air can adversely affect health and can be culturally offensive.</li><li>• Depletion of the ozone layer and high levels of solar radiation.</li><li>• The loss and degradation of this resource through drainage, pollution and damming is a significant issue for Kāi Tahu ki Otago and is considered to have resulted in material and cultural deprivation.<sup>20</sup></li></ul>

### Relevant Policies relating to Hau

NRMP policies for Air and Atmosphere address the impacts of dust and other air-borne contaminants on health, mahika kai, cultural landscapes, indigenous flora and fauna, wāhi tapu and taoka. The policies encourage reduced vehicle emissions and the planting of indigenous plants to offset carbon emissions.

## 7.0 Additional Kāi Tahu Values

The following additional values have been identified by mana whenua as relevant to the proposal.

### 7.1 Manaakitaka

Manaakitaka is the acknowledgment of the mana of others through the expression of aroha, hospitality, generosity, and mutual respect. Mana whenua express manaakitaka when they practice their duties as kaitiaki and act in the interests of others, including future generations. Proposals such as Smooth Hill can enable the expression of manaakitaka through ensuring that social and environmental outcomes, communities and future generations are considered properly in the decision-making process.

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<sup>20</sup> Section 5.7.1 Air and Atmosphere General Issues

## **7.2 Haere Whakamua**

Haere Whakamua (future focus) emphasises the need for activities or projects to focus on how future generations might be affected. Mana whenua have the obligation to advocate for the needs of future generations as well as the protection of the natural environment into the future. This is crucial when considering the intensification of climate change over recent years and the potential for it to exacerbate the adverse impacts of projects on their receiving environments.

## **7.3 Utu**

Utu highlights the importance of reciprocity and the opportunity to restore imbalances in both the physical and spiritual realm. In practical terms, some land use activities may cause degradation to the mauri of the natural world, so there would be a corresponding need to address any imbalances. The concept of utu can also be explored through regenerative practices with regards to ecosystem restoration and enhanced native planting.

## **7.4 Tikaka**

Tikaka refers to the correct method or appropriateness of carrying out an activity. In this context tikaka should be considered to ensure that short term gains do not override the consideration of potential adverse effects on both people and the environment that could accumulate over time. Tikaka is often linked to customary practices that have been sustained throughout generations. 'Tika' means right, and 'ka' means many. In generic terms it translates to undertaking the most appropriate actions.

## **8.0 Potential Impacts on Mana Whenua Values**

The proposal to construct and operate a landfill at Smooth Hill has the potential to impact on a range of mana whenua values, including those associated with key issues, objectives and policies contained within the Natural Resources Management Plan. Potential effects relate to:

- Wai Māori - effects on mauri, whakapapa
- Cultural Landscapes – effects on whakapapa
- Air, land, indigenous biodiversity, coast – effects on kaitiakitanga and mauri.
- Recognition of mana whenua; effects on mana, manaakitanga

Effects relating to other values:

- Haere Whakamua, Ki uta ki tai, Utu, Tikaka

## **8.1 Wai Māori – Effects on Mauri, Whakapapa**

Mana whenua have an association with Ōtokia Creek, a catchment that supports cultural values. This is recognised in the Regional Plan Water for Otago, which describes numerous Kāi Tahu values for Ōtokia Creek as including:

- kaitiakitaka (guardianship)
- mauri (life principle)
- wāhi tapu (sacred place)
- wāhi taoka (treasured place)
- mahika kai
- kohaka (nesting or spawning area)
- ara tawhito (traditional travel route)
- tauraka waka (canoe mooring site)
- cultural materials

Ōtokia Creek has become degraded over time. Mana whenua note that Ōtokia Creek, which receives flow from a tributary within the landfill catchment, has been identified on the Land and Water Aotearoa Website as a high-risk area in terms of bacterial contamination, particularly during and after high rainfall events. A natural character assessment carried out by the Otago Regional Council also notes that water quality for the creek has diminished due to farming runoff and nutrient pollution. Mana whenua consider that it is especially important that degraded environments are protected from further degradation.

The proposed landfill is expected to have an effect on groundwater and surface water in the catchment by altering the hydrology. Groundwater and surface water will move differently both spatially (i.e. move to different locations in the catchment) and temporally (the time it takes water to move will change). Water will no longer infiltrate through the



ground across the landfill footprint, locally reducing groundwater recharge. However, the attenuation basin has been designed with no lining in the base to allow infiltration of stormwater to the underlying groundwater system. This recharge is anticipated to provide sufficient soakage to mitigate the majority of the loss of groundwater recharge.

Changes to hydrology also affect mauri. The mauri of water is affected by many factors such as the geology of the ground it moves through and over or other waters that it mixes with. The proposed landfill will affect both of these factors, and therefore will also affect mauri. Mauri comes from the headwaters. These are meant to be the most pristine waters within a catchment. Locating a landfill site in the headwaters of Ōtokia Creek will negatively affect the mauri of the catchment. It is accepted that there will be a quantity of leachate from the landfill that enters the soil and groundwater beneath it. This leachate will negatively affect the water quality of the groundwater and may also affect the microorganisms living in the soil beneath the landfill. This will negatively affect mauri. This is exacerbated by the landfill being located in the headwaters, where water is expected to be pristine. Being located in the headwaters also means that the negative effects of mauri flow downstream with the water and are felt throughout the catchment.

Changes to hydrology also affect the whakapapa of the catchment and its water. The whakapapa of a catchment includes where its water flows to and from. Whakapapa is commonly translated as 'genealogy', and in Te Ao Māori, rivers are thought of as having their own genealogy. There are many components that make up the whakapapa of a river, including the climate of the catchment (such as where rain falls and how often), its underlying geology (which dictates how fast water will move and where, and also affects the chemical composition of the water which is part of its mauri) and where different waters move within the catchment and when.

If the proposed landfill is constructed, although water will still flow into groundwater, it will be different water than had been flowing there before i.e. instead of rainwater infiltrating into the ground, it will be stormwater from the attenuation basin. Similarly, there are expected to be changes to the baseflow of Ōtokia Creek, with a small increase in groundwater baseflow. As described above, the source of this water will have changed, and the change in quantity of water is also an alteration to the whakapapa of Ōtokia Creek.

Changing where water flows affects the whakapapa and intrinsically changes the nature of the catchment because the water will not flow in the same way as it did naturally, and different waters will be flowing into places they did not previously flow. This will inevitably alter population composition of flora and fauna.

If contaminants from leachate or sediment enter groundwater or surface water this will also negatively affect the mauri of this water and all water downstream. Contaminants can negatively affect the health of the water itself, and all life within it and sustained by it. This includes birds, aquatic and riparian vegetation and aquatic fish and invertebrates. Stygofauna and bacteria living in groundwater may be affected, for example, by increased nitrogen concentrations from leachate. Effects on stygofauna can in turn affect the flow of water through the ground. For example, stygofauna ingest and digest bacteria (Sinton 1984, Fenwick et al. 2004,), keeping finer aquifer pore spaces open and water flowing through these pore spaces. Stygofauna are not well studied, so potential effects on them are not well understood, but it is important to acknowledge that leachate may have an effect on the microorganisms living in groundwater, and that this may also affect the movement of water through the ground.

The technical reports indicate that any effects on water from leachate leaking out of the proposed landfill are expected to be negligible due to leachate management measures built into the landfill design and dilution of leachate with groundwater.

Dilution as an approach is not a method that mana whenua support in this instance. It is preferable to prevent contaminants from entering water rather than relying on dilution to manage water quality.

Increased amounts of stormwater will enter the aquifer. If the stormwater that infiltrates into the groundwater carries contaminants and is of poor quality, the mauri of the groundwater and any connected surface water bodies will be negatively affected. The technical reports indicate that any effects on water from discharge of stormwater are expected to be negligible due to dilution. This is not an approach that mana whenua support. Again, it is preferable to prevent contaminants from entering water rather than relying on dilution to manage water quality.

The applicant appears to be taking an adaptive management approach. Mana whenua are generally not supportive of this approach and prefer the precautionary principle. Adaptive management relies on robust monitoring to identify any negative effects as soon as possible. Therefore, it is crucial that monitoring is fit-for-purpose. Mana whenua do not support the inclusion of a 'visual inspection' as part of monitoring. It is unclear what this entails and would seem to require a judgement call from the person carrying out the inspection.

The technical documents provided by the applicant stipulate that the ephemeral nature of the tributary within the proposed site detracts from the extent of negative impacts that Ōtokia Creek will receive from any runoff. Mana whenua do not support this logic. Mana

whenua perceive all waterways as possessing an intrinsic and spiritual life force that exists whether a waterway is ephemeral, minor, or remote. Water is not just a natural feature of the environment; it relates to all living things. Where there is water, there is life. All tributaries, no matter how small, are part of the whakapapa of the catchment. Mana whenua consider water management from a ki uta ki tai / holistic perspective, acknowledging that what occurs in one part of the catchment affects the whole, especially in headwaters which are at the top of the catchment, so that effects occurring in the headwaters flow throughout the rest of the catchment downstream.

The potential negative effects described above would further degrade an already degraded system. It is the aspiration and duty of mana whenua to enhance the health and wellbeing of all bodies of water as kaitiaki (guardians), and further degradation would further compromise the numerous values that the waterbody supports. As discussed above, all areas of the ecosystem are connected and so too are the values that mana whenua hold for them.

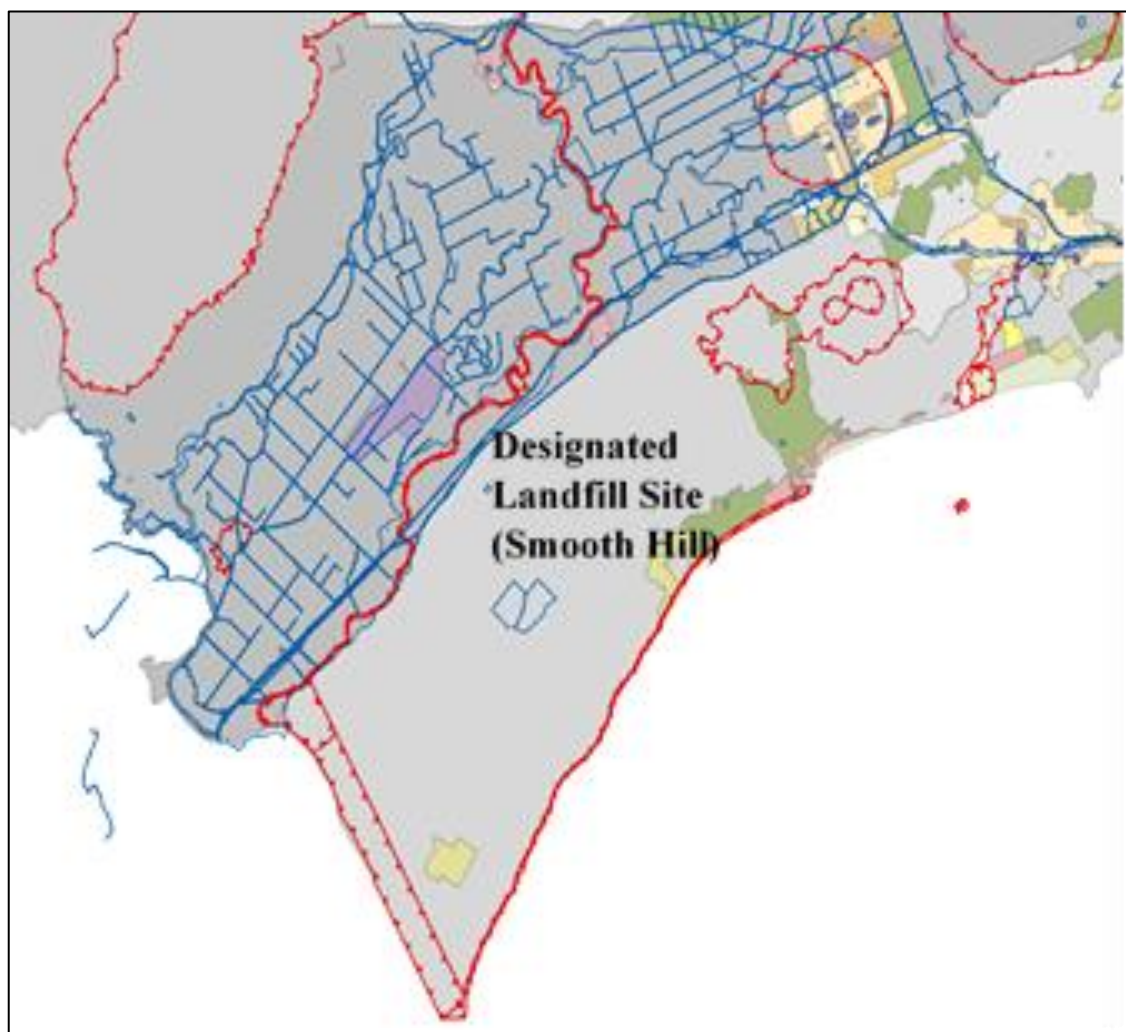
**Recommendations: Wai Māori**

- That all practicable measures are taken to prevent discharges entering water, including preventing where possible leachate from entering groundwater and surface water.
- That stormwater quality is tested. If stormwater contains high concentrations of harmful contaminants, then it should not be allowed to infiltrate groundwater.
- That effects on mauri and whakapapa from contaminants entering water and altering the existing hydrology are offset by measures such as riparian planting and pest management. While these measures do not directly address the negative effects on mauri, they will enhance the mauri of the area.
- That baseline monitoring is undertaken before any work can be undertaken. This will allow any effects to be identified and measured.
- That visual inspection monitoring, where proposed, is replaced with a more objective monitoring method.

That additional groundwater and surface water monitoring sites are installed and monitored within the tributary to Otokia Creek outside of the designated site.

## 8.2 Cultural Landscapes – Effects on Whakapapa and Maumaharataka

Mana whenua consider the whole of the Dunedin district to be ancestral land,<sup>21</sup> that is, the whole of the district is considered to be a wāhi tūpuna. Within the district, particular areas have been mapped in the DCC second generation plan (DCC2GP) as wāhi tūpuna. While the Smooth Hill site is not a mapped wāhi tūpuna in a statutory sense, conceptually it is still considered to be part of a broad scale wāhi tūpuna. **Figure 9** below illustrates in red the specific wāhi tūpuna contained within the DCC2GP surrounding the site.



*Figure 9: Wāhi Tūpuna in the vicinity of the Smooth Hill site.*

The wāhi tūpuna in the vicinity of the Smooth Hill site are detailed below with further detail being available in Appendix A4 of the DCC Second Generation District Plan.:

<sup>21</sup> Reference: DCC 2GP page X; PORPS p. X

- No. 54 Pukemakamaka/Turimakaka (Saddle Hill/Jaffrays Hill)
- No. 55 Upper slopes of Scroggs Hill and Saddle Hill
- No. 56 Kokika o Te Matamata (area surrounding Mosgiel)
- No. 59 Coast from Taieri Mouth to Brighton
- No. 60 Taieri Māori Reserve
- No. 62 Taieri River
- No. 64 Maukatua (Maungaatua)

The Kāi Tahu cultural values that underlie the protection of wāhi tūpuna are rakatirataka, mana, kaitiakitaka and whakapapa. While there have been no archaeological finds of Māori origin within the Smooth Hill site, conceptually the site forms part of a highly valued and used wāhi tūpuna within the wider Taieri District. The Partially Operative Regional Policy Statement for Otago recognises the importance of the linkages between wāhi tūpuna<sup>22</sup>. As set out above, the site also forms part of the Ōtokia Creek catchment where particular Kāi Tahu values have been identified.

**Figure 10** below illustrates the placenames visible on the public layer of the Ngāi Tahu atlas Kā Huru Manu. The traditional place name of Te Kotu is located in the vicinity of the proposed site, although this is only visible on the non-public layer.

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<sup>22</sup> Provisions: (These are beyond appeal)



**Figure 10: Map showing place names in the area surrounding the proposed site - Sourced from Ngāi Tahu Kā Huru Manu Atlas**

Mana whenua aim to preserve the ancestral values associated with their takiwā (area) for their children and for generations to come. Archaeological evidence is a small part of what makes an area significant to mana whenua. Mana whenua view the site in the context of the wider Taieri ancestral landscape.

The construction of a landfill will leave the landscape permanently modified and with it, the wāhi tūpuna values that mana whenua attribute to it. A facility that diminishes the mauri of the landscape through its functions as a depository for waste is inherently at odds with a valued cultural landscape. However, there is the opportunity through this project to enhance the whakapapa connection of mana whenua to this landscape, through measures such as adopting a planting palette which references the whakapapa of place and the historical presence of mana whenua in the area.

The archaeological assessment identified a cluster of early Māori archaeological remains within proximity of the site. This demonstrates the use of the area by mana whenua as part of a cultural landscape. Mana whenua require that there are robust measures taken to ensure that any early Māori archaeological remains that are uncovered within the scope of works are appropriately managed.



There are also opportunities to tell the Kāi Tahu story of the broader Taieri cultural landscape through the educational facility that may be developed at the site. Restoring the footprints of the tribe to the landscape through interpretive information acknowledges the first peoples of the area and tells of their uses of the land and its resources.

#### **RECOMMENDATIONS : Whakapapa & Wāhi Tupuna**

Mana whenua are generally supportive of the HNZPT recommendations with respect to archaeological works and handling of materials. However, should early Māori material be uncovered then mana whenua, through Aukaha, expect to be engaged to inform decision making with respect to any response.

In collaboration with mana whenua, the applicant should consider ways for communicating the significance of the broader Taieri cultural landscape within the scope of the project. This could be achieved through interpretative signage, or integration of information and interpretation into any educational facility. Another example could be to adopt the cultural practice of tapatapa, or naming, if mana whenua wish.

Planting palletes within the project site, and around the perimeter should prioritise planting that has a whakapapa to the area and a whakapapa to mahika kai species and practices.

The applicant should make contact with mana whenua, through Aukaha, to discuss archaeological finds near the area that have not been made public.

### **8.3 Air, Land, Indigenous Biodiversity and Coast: Effects on Kaitiakitanga and Mauri**

Kaitiakitaka is a widely used term, first penned in the Resource Management Act 1991, but based on the traditional concept of 'kaitiaki'. Post European contact, the traditional 'kaitiaki' functions have in the main been taken up by people, i.e mana whenua who have adapted old customs to address new challenges. Kaitiakitaka is intergenerational, and can be briefly summed up as having the right and responsibility to care and look after our environment handed to us by our ancestors for tomorrow's generation – our children and grandchildren.

Kaitiakitanga can be expressed through environmental restoration, biodiversity enhancements, planting, pest control and water monitoring. At another level,

kaitiakitanga is carried out through formal involvement in submissions, presenting hearings evidence, and partnering with councils and developers on projects. Kaitiakitanga is an inherited responsibility, and whānau are conscious of leaving behind a landscape and resources that are in as good, if not better state for future generations to inherit.

Of particular interest to mana whenua in the current proposal are taoka species that are at risk, and the enhancement of degraded areas. The Lower Ōtokia Creek Marsh is categorised as a Regionally Significant Wetland by the Otago Regional Council. In a natural character assessment carried out by the ORC for Dunedin City, it was also noted that the Lower Ōtokia Creek Marsh vegetation was largely indigenous. The area around Ōtokia Creek is also home to terrestrial invertebrates and mokomoko (lizards). Several bird species were observed at the proposed project area, including species considered to be taoka (treasures) by mana whenua, such as the kārearea (eastern falcon) which is also classified 'At Risk' by the Department of Conservation.

Mana whenua cannot carry out their duties as kaitiaki if the construction and operation of the proposed landfill results in adverse impacts on at risk species and degraded areas.

Wetlands support entire ecosystems and have long held historical, cultural, economic, and spiritual significance for mana whenua and Māori in general. They are also often referred to as the 'kidneys of the earth' due to their cleansing properties for all water that passes through them. It is understood that there are less than 15% of marshes left in Otago and the Lower Ōtokia Creek Marsh is one of them. It also serves as a habitat for waterfowl and it has been recorded that kakī (black stilts), a native wading bird which is regarded as a *taoka* species has been observed at the marsh in the past. With these significant wetlands in the area and the values associated with them, contamination and changes detrimental to the hydrological function of these areas will affect ecosystems and consequently mauri.

Ecosystems are currently thriving in the Lower Ōtokia Creek Marsh. Wetlands are the basis of matauraka (cultural knowledge) in the form of mahika kai practices that are still relevant to this day. As kaitiaki, mana whenua seek to enhance and restore degraded areas and preserve the knowledge and the resources that the area holds for generations to come.

The Ōtokia Creek has also been identified as a significant fish spawning area as well as a significant area for the development of juvenile fish. The Otago Regional Water Plan also states that the Ōtokia Creek serves as a habitat for indigenous fish species threatened with extinction and as a significant habitat for banded kokopu, also known as

native trout. It appears that no fish surveys were undertaken as part of the ecological assessment, and rather that the presence or absence of species was predicted.

It is important to ensure that any potential harm to Ōtokia Creek and its ecosystem is mitigated. Though the streams within the proposed site are ephemeral, this does not guarantee that there will be no runoff into the Ōtokia Creek further downstream. As noted in the Ecological Assessment, the swamp wetland and valley floor marsh wetland form part of the headwaters of the Ōtokia Creek catchment which may contain some surface water throughout the year. The choice to dismiss the ephemeral streams and potential for harm to Ōtokia Creek is inconsistent with the holistic worldview supported by the notion of 'Ki uta, ki tai'.

The Southern grass skink are characterised as an At Risk – Declining lizard species of high ecological value and the Kārearea (Eastern Falcon) characterised as an at risk – recovering species, both which are present in the proposed site. As stated in the Ecological Assessment, some vegetation areas that are proposed to be cleared for the construction of the landfill are typical habitats for these species. Construction during the breeding season of Kārearea could result in adverse effects on Kārearea that are present at the time.

It is impossible that the mauri of the area will not experience short- and long-term effects. Establishing a facility where waste is stored and processed is already subjecting the mauri of the area to degradation. Further degradation of mauri would occur if elements of the design failed and contamination of water, air and land resulted.

Leachate permeating through the site layers has one of the biggest potential impacts on mauri. All landfills experience some leachate leakage over time. There is an acceptance that leachate leakage will occur despite the robustness of mitigation measures. Leachate will also continue to generate and build up in the collection system after the landfill closes. Mana whenua understand that in most cases leachate leakage occurs slowly and in small quantities meaning that the immediate environment will not suffer instantaneously. However, mana whenua has concerns over the cumulative effects that might not be seen until years and even generations after the landfill closes.

Mana whenua apply an intergenerational perspective to all scenarios. There are no guarantees that the landfill would not yield detrimental effects in the long term. It is particularly concerning because if this were to occur, whether through leachate leakage or methane gas escaping because of waste decomposition, the health of the surrounding environment and its natural and spiritual features will suffer. Ultimately, this

means that the life supporting capacity, or the mauri of the area might diminish or cease to exist.

Mauri is all encompassing and all things both living and inanimate possess mauri and all these things are connected. From the natural landscape and ecosystems that thrive throughout it to the species discussed above, to the wetlands and waterways; perennial or ephemeral, to the people who rely on the land and its parts; if any of these were to be adversely affected, so too would the mauri of the area.

**Recommendations: Kaitiakitaka and Mauri**

Any ecological management plans are developed prior to the granting of resource consent.

That any works are undertaken outside of the kārearea breeding season

That fish surveys are completed prior to any works being undertaken to confirm the species present in the nearby waterbodies. This could be undertaken as part of the baseline monitoring.

Ensure landfill design elements and mitigation measures are controlled and regularly monitored so that degradation of the mauri of the ecosystem within, and beyond the site is avoided or eliminated.

Enhance water quality monitoring system outside of the designated area as it relates to the tributary of Ōtokia Creek. Mana whenua consider that visual inspection is insufficient.

More information is required as to what measures are in place to mitigate mass leachate diffusion and subsequent influencing of ground and surface water in the Ōtokia Creek in the event of a natural hazard.

Initiate wetlands and creek margins replanting programme.

The applicant should consider a process of resourced and ongoing engagement with mana whenua, to enable inputs and information exchange regarding any Falcon, Lizard and Environmental Management Plans including water quality management, rehabilitation, heritage and biodiversity monitoring.

The applicant ensures that thorough analysis of alternative solutions has been undertaken, documented and disseminated to mana whenua and stakeholders.

## **9.0 Recognition of Mana Whenua: Effects on Mana, Manaakitanga, Kaitiakitanga**

It is a fundamental principle of the Treaty of Waitangi to actively protect Māori interests. This duty is not merely passive, but rather entails the taking of active steps, to the fullest extent practicable, to protect the features of the environment that are of significance to them.

The principles of the Treaty of Waitangi imply a partnership, to be exercised with the utmost good faith. For Kāi Tahu, effective participation in the management of the district's environment is best achieved by establishing partnerships with local authorities as representatives of the Crown with delegated functions.

Mana can be upheld by the DCC recognising mana whenua as a Treaty partner in a responsive way. The request for this CIA allows mana whenua to examine the full extent of the proposal on a wide ranging set of values. It is important for the applicant to reflect the concerns in this CIA adequately in its application, and note that cultural effects go well beyond discrete archaeological sites.

It is important for the applicant and mana whenua to work through how recommendations from this report may be dealt with, particularly with regard to waterbodies, monitoring, ecology, biodiversity and matters relating to site rehabilitation.

Mana whenua may wish to consider ongoing engagement and reporting as part of consent conditions. It could also involve resourcing an advisory group or advisor and meeting on a regular basis (at least annually). Meaningful engagement and involvement can help ensure cultural values are adequately and appropriately considered and incorporated into the landfill management over its lifespan.

Effective partnerships mean that mana whenua are involved in natural resource and environmental management at both the management and governance levels of decision-making. Kāi Tahu values and policies should be represented and reflected in local government policy directives and operationalised.

Recognition of mana involves DCC committing to sustaining relationships over the long term. Parties must respect the knowledge, experience, and skills of each other if effective partnerships are to develop. Building in funding for ongoing mana whenua engagement throughout the life of this project, and for ongoing monitoring, should consents be granted, is critical.

Mana whenua exercise customary authority/chieftainship or rakatirataka of the wider Taieri area. As mana whenua, Te Rūnanga o Ōtākou are kaitiaki of a place that is highly valued by the wider public. Brighton Beach, the wetland and the coastline to the north and south are very popular in the summer, and are valued by both the local community and residents of Dunedin's suburbs. Any adverse effects resulting from the proposal would impact on the mana of the people of Ōtākou as it would compromise their ability to be effective kaitiaki in their takiwā. Degradation, or perception of poor water quality in the catchment, would undermine their ability to manaaki the city's residents and visitors by ensuring the city has clean beaches where swimming and recreational activities can be enjoyed without fear of pollution or contamination. Manaakitaka embodies showing hospitality or extending aroha (love) to others and is a recognition of the mana of the individual by mana whenua.

The potential effects of leachate leakage from the landfill illustrates how an impact on the environment may impact on cultural values, and consequentially on mana. While the landfill would be designed and constructed to meet standards and specifications, all measures need to be undertaken that ensure leachate is contained within the layers. Leachate leakage beyond the 600mm compacted clay is not acceptable to mana whenua. While groundwater collected in the subsoil drainage system would be monitored before its subsequent discharge to the attenuation basin, and hydraulic gradient groundwater monitoring wells may provide advanced warnings of potential impacts to surface water quality, if these mechanisms were to fail and result in adverse impacts on any part of the immediate or surrounding environment, mana would be diminished as a consequence.

Leachate leakage that resulted in contamination of the surrounding waterbodies or wetlands which support taoka species would affect mana whenua values in these areas and diminish mauri. Mana whenua's ability to practice kaitiakitaka would also be compromised and in turn, their ability to express manaakitaka and therefore their mana.

*Our mana is interconnected to our mauka, awa, roto, whenua (mountains, rivers, lakes and land), to our tūpuna who walked these lands, and who left their mark in the placenames, camp sites and tradition of mahika kai. Mana can be lost.*

Kaitiakitaka is the practical expression of rakatirataka, it involves the exercise of customary authority over the way a resource is used, managed and protected. As mana whenua, Te Rūnanga o Ōtākou have the responsibility for exercising kaitiakitaka in the area.



Implementation of kaitiakitaka in the present day requires a commitment from those exercising statutory authority to the use of consultation, participation and decision-making processes that directly involve Kāi Tahu. This will acknowledge the mana inherited through whakapapa and enable the expression of kaitiakitaka.

*Our traditions are in the landscape. It's like a book to us, the names, the stories, the traditions. All these things combine to narrate the story of connection and association. The land is part of Papatūānuku. It still has water running through it, it keeps on giving in terms of how we relate to this place. The way we talk about these things on wānaka (meetings) or hīkoi (journeys/walks) are strong stimuli in terms of the way the land speaks to us about the past, our heritage, our kōrero, it is so important going forward for us and future generations.*

#### **Recommendation: Recognition of mana whenua**

That DCC consider a process of resourced and ongoing engagement with Te Rūnanga o Ōtākou, with particular regard to input into and reporting on environmental and ecological management plans, water management, closure and rehabilitation, heritage, biodiversity and monitoring.

### **9.1 Supporting values: Ki uta ki tai, Haere whakamua, Utu and Tikaka**

In line with the holistic catchment-wide outlook which 'Ki Uta ki Tai' represents, mana whenua has a lens which looks beyond the project specific impacts and considers the more wide-ranging implications of the proposed landfill. However, it is important to look at the landfill as it sits within the regional and national level direction on waste management. At these levels, there are aspirations to move towards a zero waste, circular economy approach and protecting the natural environment. Mana whenua aspirations are consistent with these takiwā and national policy directives..

In finding more environmentally friendly ways to conduct everyday life, this then extends into the wider national kaupapa (agenda) for fighting against climate change, which is adversely impacted if we carry out activities that lead to damaging effects on the environment. Similarly, Te Mana o te Wai (Freshwater NPS) has also been evolving in recent years to put further emphasis on prioritising the health and well-being of all freshwater bodies.

Mana whenua are concerned that the proposed landfill might become a liability for future generations in terms of residual risks of contamination and associated effects, highlighting the need for ongoing monitoring and maintenance requirements. The landfill is very much a current solution and whether it will only cause problems in 55 years' time is an issue that needs to be considered.

Tikaka raises the question of whether the proposed landfill is in fact the best solution for society moving forward. A study carried out by Pauling and Ataria (2010) on Ngāi Tahu values and issues regarding waste showed that a key theme was the desire for a collective shift towards a zero-waste lifestyle.

With the unprecedented environmental challenges that we as a society face today, it is vital now more than ever to seriously consider solutions to waste management that are outside the standard approach and which support the aspirations at all levels of government. This intent encapsulates the values of haere whakamua (future focus), utu (restoration of ecosystem imbalances) and tikaka (appropriate actions). As such, mana whenua support the aspirations and initiatives of the Dunedin City Council that are reflected in the Waste Futures programme and the overall movement to a more circular economy.

#### **Recommendation: Supporting Values**

Mana whenua request that the applicant develops, funds and adheres to an implementation strategy to enable an efficient shift to a zero waste future.

This will require forward thinking, adaptability, innovation and accountability to the community to ensure that landfill solutions are phased out.

The applicant ensures that thorough analysis of alternative solutions has been undertaken, documented and disseminated to mana whenua and stakeholders.

## **10.0 Hau**

Hau covers all issues relating to air and the potential pollutants to it. For this project, this includes the dust generation from increased traffic in the area, construction earthworks and operational works within the landfill. There is also potential for increased carbon emissions from the vehicles, potential odours, and potential methane gas emissions from the landfill. These sources could weaken the mauri and overall wellbeing of the landscape and in turn, adversely affect the ecosystems supported in the area should the effects of these elements not be sufficiently mitigated.

Mitigation measures are identified in GHD's assessment report for effects from discharges on nearby residential properties, effects from dust discharges and effects from combustion gases<sup>23</sup>. Mitigation measures for odour generating activities within the operation of the landfill include filling cells from the base of the valley to the top of the cell (bottom up), or top down for Stages 2, 4 and 5, keeping the working face to a minimum, scheduling of riskier operations according to wind directions and managing and progressively covering exposed areas.

Dust generating activities associated with construction and operation are intended to be managed through use of watercarts, sprinkler systems, sealed trafficable areas, efficient construction methodologies and ongoing monitoring of weather conditions.

Emissions associated with landfill gas combustion flare are stated to have a destruction efficiency of 99.9%, and will be located at 8m high. Accordingly, the application suggests that these pollutants are 'very unlikely' to cause adverse off-site effects.

As such the air quality assessment suggests that measures for emission management will likely be successful in mitigating the effects of odour and dust both within and beyond the site. On the basis that these mitigation measures are sufficient (and regularly monitored) then the life supporting capacity and mauri of air and flora, fauna and mahika kai will be protected.

**Recommendation: Hau**

Ensure mitigation measures are monitored, controlled and regularly reviewed

Ensure residential properties in proximity to the site are engaged with

## 11.0 Conclusion

This CIA has been prepared to assess the cultural impacts associated with the proposed Landfill at Smooth Hill, Brighton, Dunedin. The process for developing this CIA involved reviewing the technical reports, undertaking a site visit, and reviewing and analysing the proposal against policies from the Kai Tahu Ki Otago Natural Resource Management Plan and a cultural values framework.

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<sup>23</sup> Air Quality report S.12

Overall, the CIA process has identified a number of key areas where the proposal has the potential to impact on cultural values, particularly in relation to:

- The involvement of Papatipu Rūnanga as kaitiaki and manawhenua;
- The protection and enhancement of waterbodies and indigenous biodiversity, including remnant wetlands and the coast, and;
- The protection of archaeological and ancestral landscape values.

In noting the above however, the proposed mitigation measures have the potential to manage key environmental impacts primarily through design elements and systems around stormwater and leachate management, sediment control, dust and odour management, waterway protection, enhancement and monitoring. The development and implementation of an Environmental Management Plan, Karearea and Lizard management plans, along with the landscaping initiatives are seen as positive.

A robust and appropriate monitoring regime, a work programme to address non-compliance associated with water quality as well as ways to contribute to further indigenous biodiversity outcomes, particularly through riparian and wetland restoration, are key matters to consider going forward, as is the ongoing involvement of rūnaka. A summary of recommendations arising from this CIA are included in **Appendix A** below.

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## Appendices

### Appendix A Summary of Recommendations

The following recommendations will assist in remedying those impacts as well as improving the health of the receiving environment.

#### **Recommendations: Wai Māori**

That all practicable measures are taken to prevent discharges entering water, including preventing where possible leachate from entering groundwater and surface water.

That stormwater quality is tested. If stormwater contains high concentrations of harmful contaminants, then it should not be allowed to infiltrate groundwater.

That effects on mauri and whakapapa from contaminants entering water and altering the existing hydrology are offset by measures such as riparian planting and pest management. While these measures do not directly address the negative effects on mauri, they will enhance the mauri of the area.

That baseline monitoring is undertaken before any work can be undertaken. This will allow any effects to be identified and measured.

That visual inspection monitoring, where proposed, is replaced with a more objective monitoring method.

That additional groundwater and surface water monitoring sites are installed and monitored within the tributary to Otokia Creek outside of the designated site

#### **Recommendations: Kaitiakitaka and Mauri**

Any ecological management plans are developed prior to the granting of resource consent.

That any works are undertaken outside of the kārearea breeding season

That fish surveys are completed prior to any works being undertaken to confirm the species present in the nearby waterbodies. This could be undertaken as part of the baseline monitoring.

Ensure landfill design elements and mitigation measures are controlled and regularly monitored so that degradation of the mauri of the ecosystem within, and beyond the site is avoided or eliminated.



Enhance water quality monitoring system outside of the designated area as it relates to the tributary of Ōtokia Creek. Mana whenua consider that visual inspection is insufficient.

More information is required as to what measures are in place to mitigate mass leachate diffusion and subsequent influencing of ground and surface water in the Ōtokia Creek in the event of a natural hazard.

Initiate wetlands and creek margins replanting programme.

The applicant should consider a process of resourced and ongoing engagement with mana whenua, to enable inputs and information exchange regarding any Falcon, Lizard and Environmental Management Plans including water quality management, rehabilitation, heritage and biodiversity monitoring.

The applicant ensures that thorough analysis of alternative solutions has been undertaken, documented and disseminated to mana whenua and stakeholders.

**Recommendation: Recognition of mana whenua**

That DCC consider a process of resourced and ongoing engagement with Te Rūnanga o Ōtākou, with particular regard to input into and reporting on environmental and ecological management plans, water management, closure and rehabilitation, heritage, biodiversity and monitoring.

**Recommendation: Haere whakamua, Tikaka, Utu**

Mana whenua request that the applicant develops, funds and adheres to an implementation strategy to enable an efficient shift to a zero waste future.

This will require forward thinking, adaptability, innovation and accountability to the community to ensure that landfill solutions are phased out.

The applicant ensures that thorough analysis of alternative solutions has been undertaken, documented and disseminated to mana whenua and stakeholders.

**Recommendation: Hau**

Ensure mitigation measures are monitored, controlled and regularly reviewed

Ensure residential properties in proximity to the site are engaged with

## Appendix B: Glossary of Māori Terms

Māori	English
ara tawhito	traditional travel routes/ ancient trails
hapū	clan/subtribe
Kāi Tahu Whanui	The collective of the individuals who descend from the primary hapū of Waitaha, Kāti Mamoe, and Kāi Tahu
kāika	permanent settlement/occupation site
kaitiaki; kaitiakitaka	guardian; guardianship
kaupapa	agenda, initiative, issue
ki uta ki tai	from the mountains to the sea
ki uta ki tai	from the mountains to the sea
mana	prestige, authority
mauri	life principle, special character
mōkihi	reed rafts
nohoaka	temporary campsite/settlement
pā	fortified village/settlement
pūrakau	stories
raupō	bulrush
rūnaka	tribal council, iwi authority
take whenua	an inherited right
takiwā	area
taniwha	monster
taoka	treasure
tauraka waka	canoe mooring sites
tī kōuka	cabbage tree
tūpuna	ancestor

umu takata	rights through conquest
wāhi mahika kai	food gathering places
wāhi taoka	treasured place
wāhi tapu	sacred place
wāhi tūpuna	ancestral place
wairua	spirit
waka	canoe
whakapapa	genealogy, cultural identity
whānau	family

## Appendix C: Statutory Context

### Resource Management Act 1991 – Part 2

#### 5. Purpose

(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.

(2) In this Act, “sustainable management” means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural well being and for their health and safety while -

- (a) Sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations;
- (b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
- (c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

**6. Matters of national importance** – In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

- (a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development;
- (b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development;
- (c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna;
- (d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers;
- (e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga;
- (f) the protection of historic heritage from inappropriate subdivision, use, and development;
- (g) the protection of protected customary rights;
- (h) the management of significant risks from natural hazards.

**7. Other matters** - In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to –

(a) kaitiakitanga:

(aa) the ethic of stewardship:

(b) the efficient use and development of natural and physical resources:

(ba) the efficiency of the end use of energy:

(c) the maintenance and enhancement of amenity values:

(d) intrinsic values of ecosystems:

(e) *[Repealed]*

(f) maintenance and enhancement of the quality of the environment:

(g) any finite characteristics of natural and physical resources:

(h) the protection of the habitat of trout and salmon:

(i) the effects of climate change:

(j) the benefits to be derived from the use and development of renewable energy.

**8. Treaty of Waitangi** - In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

## Appendix D: Kāi Tahu ki Otago Natural Resource Management Plan 2005

<b>SECTION 5 OTAGO REGION TE ROHE O OTAGO</b>	
<b>Section 5.2 Overall Objectives</b>	
i.	The rakātirataka and kaitiakitaka of Kāi Tahu ki Otago is recognised and supported.
ii.	Ki Uta Ki Tai management of natural resources is adopted within the Otago region.
iii.	The mana of Kāi Tahu ki Otago is upheld through the management of natural, physical and historic resources in the Otago Region.
iv.	Kāi Tahu ki Otago have effective participation in all resource management activities within the Otago Region.

<b>Section 5.3 Wai Māori</b>	
<b>Section 5.3.2 Wai Māori General Issues</b>	
<ul style="list-style-type: none"> <li>• Current water management does not adequately address Kāi Tahu ki Otago cultural values.</li> <li>• Cross mixing of water.</li> <li>• Deteriorating water quality.</li> <li>• Lack of consideration given to Kāi Tahu ki Otago cultural values in water research.</li> </ul> <p><b>Discharges:</b></p> <ul style="list-style-type: none"> <li>• Cumulative effects of discharges.</li> <li>• View that due to dilution rates, discharges to water have little or no effect.</li> </ul> <p><b>Land Management and Use including:</b></p> <ul style="list-style-type: none"> <li>• Draining of wetlands.</li> <li>• Lack of proper riparian management throughout an entire catchment.</li> <li>• Sedimentation from land use and development.</li> <li>• Accidental discovery of cultural materials or sites from changed land use.</li> </ul>	
<b>Section 5.3.3 Wai Māori General Objectives</b>	
i.	The spiritual and cultural significance of water to Kāi Tahu ki Otago is recognised in all water management.



ii.	The waters of the Otago Catchment are healthy and support Kāi Tahu ki Otago customs.
iv.	Contaminants being discharged directly or indirectly to water are reduced.
v.	Flow regimes and water quality standards are consistent with the cultural values of Kāi Tahu ki Otago and are implemented throughout the Otago Region and lower Waitaki Catchment.
<b>Section 5.3.4 Wai Māori General Policies</b>	
1.	To require an assessment of instream values for all activities affecting water.
2.	To promote the cultural importance of water to Kāi Tahu ki Otago in all water management within the Otago Region and Lower Waitaki Catchment.
4.	To protect and restore the mauri of all water.
5.	To encourage the use of the Cultural Health Index as a tool for monitoring waterways.
<b><i>Discharges:</i></b>	
10.	To encourage all stormwater be treated before being discharged.
12.	To encourage Kāi Tahu ki Otago input into the development of monitoring programmes.
13.	To require monitoring of all discharges be undertaken on a regular basis and all information, including an independent analysis of monitoring results, be made available to Kāi Tahu ki Otago.
14.	To encourage Management Plans for all discharge activities that detail the procedure for containing spills and including plans for extraordinary events.
15.	To require all discharge systems be well maintained and regularly serviced. Copies of all service and maintenance records should be available to Kāi Tahu ki Otago upon request.
16.	To require re-vegetation with locally sourced indigenous plants for all disturbed areas. Re-vegetation should be monitored by an assessment of the vegetative cover at one growing season after establishment and again at three seasons from establishment.
17.	To require visible signage informing people of the discharge area; such signs are to be written in Māori as well as English.
18.	To require groundwater monitoring for all discharges to land.
<b><i>Land Use and Management:</i></b>	
54.	To promote land use that suits the type of land and climatic conditions.

56.	To oppose the draining of wetlands. All wetlands are to be protected.
58.	To promote integrated riparian management throughout entire catchments.

<b>Section 5.4 Wāhi Tapu</b>	
<b>Section 5.4.2 Wāhi Tapu General Issues</b>	
<ul style="list-style-type: none"> <li>• Destruction and modification of wāhi tapu through the direct and indirect effects of development and resource use.</li> <li>• Contamination by discharges and other activities seriously erodes the cultural value and integrity of wāhi tapu.</li> <li>• The resurfacing of kōiwi takata through natural and human-induced processes.</li> <li>• Access to culturally important sites has been impeded.</li> <li>• Misinterpretation of the status and importance of wāhi tapu.</li> </ul>	
<b>Section 5.4.3 Wāhi Tapu Objectives</b>	
i.	i. All wāhi tapu are protected from inappropriate activities.
ii.	Kāi Tahu ki Otago have access to wāhi tapu.
iii.	Wāhi tapu throughout the Otago region are protected in a culturally appropriate manner.
<b>Section 5.4.4 Wāhi Tapu General Policies</b>	
1.	To require consultation with Kāi Tahu ki Otago for activities that have the potential to affect wāhi tapu.
2.	To promote the establishment of processes with appropriate agencies that: <ul style="list-style-type: none"> <li>i. enable the accurate identification and protection of wāhi tapu.</li> <li>ii. provide for the protection of sensitive information about the specific location and nature of wāhi tapu.</li> <li>iii. ensure that agencies contact Kāi Tahu ki Otago before granting consents or confirming an activity is permitted, to ensure that wāhi tapu are not adversely affected.</li> </ul>
<b>Discharges</b>	
7.	To discourage all discharges near wāhi tapu.
<b>Historic Places Trust (HPT):</b>	
11.	To require the HPT to inform the appropriate Rūnaka and/or whānau where there is the potential for any activity to result in the disturbance of wāhi tapu , including:

	<p>i. an archaeological find; and/or</p> <p>ii. the disturbance of any archaeological site; and/or</p> <p>iii. the discovery of human remains.</p> <p>Further disturbance should be prohibited until clearance has been obtained from the Papatipu Rūnaka.</p>
12.	To require HPT to implement enforcement provisions to discourage fossicking and prosecute those who destroy wāhi tapu; and
13.	To recognise Kāi Tahu ki Otago kaitiakitaka over the protection and recording of archaeological sites.

<b>Section 5.5 Mahika Kai and Biodiversity</b>	
<b>Section 5.5.2 Mahika Kai and Biodiversity General Issues</b>	
<ul style="list-style-type: none"> <li>• Point and non-point source discharges impacting on mahika kai.</li> <li>• Continued urban spread encroaching on mahika kai sites.</li> <li>• Access for Kāi Tahu ki Otago to mahika kai sites.</li> <li>• Customary accessibility of mahika kai species.</li> <li>• Research undertaken in isolation from Kāi Tahu ki Otago interests has had the effect of marginalising cultural interests.</li> <li>• Loss of indigenous biodiversity in the region.</li> <li>• Loss of species of particular importance.</li> <li>• Loss of indigenous flora and fauna remnants and lack of co-ordinated management of native corridors.</li> <li>• Poorly managed landfills, industrial sites and waste disposal sites have created contaminated soils.</li> <li>• Kā Papatipu Rūnaka believe that inappropriate use and development will adversely impact on: <ul style="list-style-type: none"> <li>▪ the diversity &amp; abundance of terrestrial and aquatic species;</li> <li>▪ the ability to access &amp; gather mahika kai resources; and</li> <li>▪ the ability to educate future generations in significant mahika kai practices</li> </ul> </li> </ul>	
<b>Section 5.5.3 Mahika Kai and Biodiversity Objectives</b>	
i.	Habitats and the wider needs of mahika kai, taoka species and other species of importance to Kāi Tahu ki Otago are protected.
ii.	Mahika kai resources are healthy and abundant within the Otago Region.

iii.	Mahika kai is protected and managed in accordance with Kāi Tahu ki Otago tikaka.
iv.	Mahika kai sites and species are identified and recorded throughout the Otago Region.
v.	Indigenous plant and animal communities and the ecological processes that ensure their survival are recognised and protected to restore and improve indigenous biodiversity within the Otago Region.
vi.	To restore and enhance biodiversity with particular attention to fruiting trees so as to facilitate and encourage sustainable native bird populations.
<b>5.5.4 Mahika Kai and Biodiversity General Policies</b>	
1.	To promote catchment-based management programmes and models, such as Ki Uta Ki Tai.
3.	To encourage collaborative research into indigenous biodiversity.
4.	To require Kāi Tahu ki Otago participation in the management of mahika kai, both introduced and indigenous.
5.	To identify mahika kai sites and species of importance to Kāi Tahu ki Otago.
6.	To protect and enhance physical access for Kāi Tahu ki Otago to mahika kai sites.
7.	To require that all assessments of effects on the environment include an assessment of the impacts of the proposed activity on mahika kai.
8.	To promote the protection of remaining indigenous fish habitat by: <ul style="list-style-type: none"> <li>i. Identifying waterways that exclusively support indigenous fish.</li> <li>ii. Prohibiting the introduction of exotic species where they currently do not exist.</li> <li>iii. Ensuring fish passage (both ingress and egress).</li> <li>iv. Removing exotic species from waterways of particular importance where this is achievable and appropriate according to Kāi Tahu ki Otago.</li> </ul>
9.	To promote the protection of traditional breeding stocks.
10.	To encourage the transfer of knowledge through generations.
12.	To protect and enhance existing wetlands, support the reinstatement of wetlands and promote assistance for landowners for fencing-off wetlands.
13.	To promote the development of a cultural monitoring tool for vegetation and ecosystem health.

15.	To promote the reintroduction of locally extinct species of importance to Kāi Tahu ki Otago to the region.
16.	To require that hazardous operations and the use, transportation and storage of hazardous substances are not to impact mahika kai and other cultural values.

<b>Section 5.6 Cultural Landscapes</b>	
<b>Section 5.6.2 Cultural Landscapes General Issues</b>	
<ul style="list-style-type: none"> <li>• There is a prevailing view that Kāi Tahu ki Otago interests are limited to Statutory Acknowledgements, Tōpuni, and Nohoaka sites.</li> <li>• Land management regimes have failed to adequately provide for Kāi Tahu ki Otago interests in cultural landscapes.</li> <li>• Extension and maintenance of infrastructure (e.g. transport, telecommunications) can affect cultural landscapes.</li> <li>• The lack of use of traditional names for landscape features and sites.</li> <li>• The building of structures and activities in significant landscapes.</li> <li>• Inability to address indirect and/or cumulative effects means that many issues of significance to Kāi Tahu ki Otago, such as linkages, are not addressed during resource management processes.</li> </ul>	
<b>Section 5.6.3 Cultural Landscapes Objectives</b>	
i.	The relationship that Kāi Tahu ki Otago have with land is recognised in all resource management activities and decisions.
ii.	The protection of significant cultural landscapes from inappropriate use and development.
iii.	The cultural landscape that reflects the long association of Kāi Tahu ki Otago resource use within the Otago region is maintained and enhanced.
<b>Section 5.6.4 Cultural Landscapes General Policies</b>	
1.	To identify and protect the full range of landscape features of significance to Kāi Tahu ki Otago.
4.	To require that the interpretation of Kāi Tahu ki Otago histories for either public or commercial reasons is undertaken by the appropriate Rūnaka and/or whānau.

<b>Place names:</b>	
7.	To encourage and promote the importance of traditional place names.
8.	To promote the use of traditional place names through official name changes.
<b>Earth Disturbance:</b>	
19.	To require all earthworks, excavation, filling or the disposal of excavated material to: <ul style="list-style-type: none"> <li>i. Avoid adverse impacts on significant natural landforms and areas of indigenous vegetation;</li> <li>ii. Avoid, remedy, or mitigate soil instability; and accelerated erosion;</li> <li>iii. Mitigate all adverse effects.</li> </ul>
<b>Roading:</b>	
20.	To require an accidental discovery protocol for all road realignments and widening and forest harvest roads and to avoid any sediment run-off during earthworks and road construction to avoid contamination of waterways.
21.	To require indigenous re-vegetation with locally sourced species for all disturbed areas. Revegetation should be monitored by an assessment of the vegetative cover at one growing season after establishment and again at three seasons from establishment.
<b>Landfills:</b>	
22.	To require site rehabilitation plans for land contaminated by landfills, tip sites, treatment plants, industrial waste, and agricultural waste.
23.	To require monitoring of methane levels for all closed landfills and that analysed data be sent to KTKO Ltd.
<b>Structures:</b>	
24.	To discourage the erection of structures, both temporary and permanent, in culturally significant landscapes, lakes, rivers or the coastal environment.

## **Section 5.7 Air and Atmosphere**

### **Section 5.7.1 General Issues**

- The cultural impacts of air pollution and discharges to air are poorly understood and seldom recognised.
- Discharges to air can adversely affect health and can be culturally offensive.

<ul style="list-style-type: none"> <li>• Motor vehicle emissions have serious cumulative effects that call for the adoption of higher emission control standards.</li> <li>• Insufficient data has been collected and distributed about the effects of air discharges.</li> <li>• Depletion of the ozone layer and high levels of solar radiation.</li> </ul>	
<b><i>Mahika Kai and Biodiversity</i></b>	
<ul style="list-style-type: none"> <li>• Clean air is important to the health of mahika kai</li> </ul>	
<b><i>Cultural Landscapes:</i></b>	
<ul style="list-style-type: none"> <li>• Impact of urban settlement and discharges to air on the visibility of cultural landscape features including the moon, stars and rainbows.</li> <li>• Dust and the impact on people's health and traditional Māori rock art.</li> </ul>	
<b>Section 5.7.2 Objectives</b>	
i.	Kāi Tahu ki Otago sites of significance are free from odour, visual and other pollutants.
ii.	Kāi Tahu ki Otago are meaningfully involved in the management and protection of the air resource.
iii.	The life supporting capacity and mauri of air is maintained for future generations.
<b>Section 5.7.3 Policies</b>	
1.	To require earthworks and discharges to air consider the impact of dust and other air-borne contaminants on health, mahika kai, cultural landscapes, indigenous flora and fauna, wāhi tapu and taoka.
2.	To encourage early consultation with Kāi Tahu ki Otago in the development of air research proposals. The level of participation will be decided by Kāi Tahu ki Otago.
3.	To require Cultural Assessments for any discharges to air including agrochemical.
4.	To encourage reduced vehicle emissions.
5.	To promote the planting of indigenous plants to offset carbon emissions.

<b>Section 5.8 Coastal Environment</b>
<b>Section 5.8.2 Taku Tai Moana Me Wai Māori Issues</b>



<ul style="list-style-type: none"> <li>Land use activities adjoining the coast adversely affect localised coastal water quality, for example from devegetation and poor riparian management.</li> </ul>	
<b>Discharge and Waste:</b>	
<ul style="list-style-type: none"> <li>Leachate from inappropriately sited landfills, casual disposal sites and potentially from landbased treatment of biosolids.</li> <li>Stormwater discharges e.g. from urban roads containing contaminants such as oil, carbon particles.</li> </ul>	
<b>Section 5.8.3 Taku Tai Moana Me Wai Māori Objectives</b>	
i.	The spiritual and cultural significance of taku tai moana me te wai māori is recognised in all management of the coastal environment.
ii.	Te Tai o Arai Te Uru is healthy and supports Kāi Tahu ki Otago customs.
<b>Section 5.8.4 Taku Tai Moana Me Wai Māori Policies</b>	
1.	To encourage the integrated management of the coastal environment.
<b>Discharges:</b>	
8.	To require that leachate from disposal sites adjacent to coastal environments is monitored and contaminated environments rehabilitated.
11.	To encourage the retention of waters within catchments to reduce runoff to the coastal environment.

<b>Section 5.8.10 Mahika Kai (Kai Moana) &amp; Biodiversity Issues</b>	
<ul style="list-style-type: none"> <li>Impact on coastal kai moana, associated habitats and sites from activities occurring in the catchment</li> <li>adjacent industrial activity as associated discharges, both point and non-point sources</li> </ul>	
<b>5.8.11 Mahika Kai (Kai Moana) &amp; Biodiversity Objectives</b>	
i.	The Marine Environment is managed in a holistic way.

